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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
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December 1964 Washington, D.C. Vol. 26, No. 12

CRAB INDUSTRY OF CHESAPEAKE BAY AND THE SOUTH--AN INDUSTRY IN TRANSITION

By Charles F. Lee* and F. Bruce Sanford**

ABSTRACT

The blue crab industry is in the initial stage of a fundamental change from hand preparation to machine preparation. Concurrently, it is scrutinizing its methods of capturing the crabs and of marketing the manufactured products to improve them also, and thereby ensure economic well-being.

INTRODUCTION

The blue crab industry ranks third in value of all the food-fish industries of the Chesapeake Bay, the South Atlantic Coast, and the Gulf of Mexico Coast, being outranked only by those based on shrimp and oysters. This important industry, which furnishes employment to a large number of people has for several years, however, faced serious economic difficulty.

Owing to the complex nature of the raw material, blue crab meat is still produced almost entirely by manual methods. The solution of its economic problems, however, requires more than mechanization, for the problems extend from the high cost of capturing the blue crabs (Callinectes sapidus), on the one hand, to marketing the manufactured product on the other. The purpose of this article therefore is to briefly discuss those three problems.

To put the problems into perspective, we shall first consider certain background information in regard to catch. Then in the light of this knowledge, we shall consider briefly the problems at each end of the chain of operations from sea to consumer--that of capture and that of marketing. Finally, we shall consider the problem of production, which is the one that is receiving immediate attention by the industry.

DISTRIBUTION OF CATCH

The blue crab industry was begun at Hampton Roads, Va., over 75 years ago, and for some time, fishing was concentrated along the shores of the Chesapeake Bay. During the last few decades, however, the industry has expanded, and fishing now is fairly evenly divided between Chesapeake Bay and the South Atlantic and Gulf Coasts. The total catch has fluctuated from year to year, but has been in the general range of 100 to 150 million pounds.

The proportionate share of the participating states also varies yearly, but the distribution reported in table is typical. Maryland and Virginia, North Carolina, Georgia, Florida, and Louisiana are the most important producers, normally accounting for 85 to 90 percent of the total catch. The seven other states account for the remaining 10 to 15 percent.

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Production of picked meat bears little relation to the catch of hard crabs in any given state. This lack of close correlation exists partly because in some cities--such as New Orleans, Baltimore, and Washington--hard crabs sold whole are very popular. Also, the differences in apparent yield of picked meat from the catch of hard crabs result from the fact that several states--for example, South Carolina, Virginia, New Jersey, and Delaware--ship some or most of their crabs to plants in neighboring states, where the meat is picked. Maryland is the most notable importer of live crabs; but Georgia, Mississippi, and Florida also import appreciable amounts and therefore produce more picked meat than their share of the catch would lead one to expect.

Production of Hard Crabs and Picked Meat, 1961

Rank	State	Production			
		Hard Crabs		Picked Meat	
		Million Pounds	Percentage of Total	Million Pounds	Percentage of Total
1	Virginia	44.0	29.8	3.95	23.3
2	Maryland	26.7	18.0	4.98	29.4
3	Florida W. Coast	17.1	11.6	2.07	12.2
4	North Carolina	15.9	10.8	1.86	11.0
5	Georgia	12.3	8.3	1.44	8.5
6	Louisiana	11.9	8.1	0.48	2.8
7	Florida E. Coast	7.5	5.1	1.19	7.0
8	South Carolina	4.7	3.2	0.21	1.2
9	Texas	2.9	2.0	0.35	2.1
10	Mississippi	2.5	1.7	0.34	2.0
11	Alabama	0.8	0.5	0.08	0.5
12	Delaware	0.8	0.5	None	-
13	New Jersey	0.6	0.4	"	-
	Total	147.7	100	16.95	100

PROBLEM OF CAPTURE

The catch of hard crabs has declined each year since the 1960 peak of 149 million pounds. Undoubtedly the normal, and still largely unexplained, variation in the population available to the crab fisherman is the cause of part of this decline. A recent survey (Lee, Knobl, and Deady 1963a), however, brought out other causes. Catching methods have changed hardly at all in decades, and exploratory studies are needed to investigate crab populations in deeper waters and in other areas not now being fished.

PROBLEM OF MARKETING

Blue crabs are marketed as whole hard crabs, live, or steamed; as soft crabs; and as picked crab meat. Most of the crab meat is marketed fresh, but some is canned, and increasing amounts are being pasteurized. Frozen crab-speciality products such as deviled crab, crab cakes, and crab creole are also increasing in popularity.

Fig. 1 - Live crabs are a popular item in the famous French Market in New Orleans. The proprietor knows that blue crabs have a belligerent disposition and uses long tongs as the safest way to handle them.

Fig. 2 - Cans of freshly picked crab meat are nested in ice along with catfish and other Southern delicacies in this French Market stall.

Pasteurization, a process in which the hermetically-sealed crab meat is heated to about 170° F. and held at that temperature for a short time, enables the packer to keep his product in refrigerated storage for several months. Pasteurized crab meat, when properly processed and stored, retains the flavor and texture of the fresh product. A trend to an in-

crease in the production of pasteurized meat and frozen specialty products has been in evidence over the past decade, for the industry has shared in the increasing popularity of convenience foods.

Considerable quantities of crab meat are used in the frozen specialty products previously mentioned. Production of those items in 1961 amounted to 7.0 million pounds valued at $7.4 million.

Canned blue crab, although second in value to frozen specialty items, is a popular product in inland areas. The value of the 1961 pack of canned meat (all styles) amounted to about $860,000.

Marketing methods have remained relatively the same over many years. Except for the Philadelphia and New York areas, the distribution of fresh crab meat is still largely limited to the coastal states where crabs are caught. Despite progress in developing new market forms such as pasteurized meat and frozen specialties, there is much yet to be done in that direction, for a considerable amount of fresh crab meat is lost each season because of spoilage or is sold at prices too low to pay the cost of production. Finding a solution to the problems of marketing will greatly benefit the industry (Lee et al. 1964).

PROBLEM OF PRODUCTION

In September 1961, the Department of Labor included crab pickers under a revision of the Fair Labor Standards Act. That Act requires that laborers be paid a minimum wage of $1 an hour, which is to be raised, in two steps, to $1.25 an hour by September 1965.

Historically, blue crab meat has been picked by hand, and the pickers have been paid on the basis of the amount they could produce. At the piece-work rate, however, many workers did not earn the minimum wage of $1 an hour, and very few earned the $1.25 hourly rate that will eventually be required by law.

SURVEY: In 1961, Congress appropriated funds for developing means to save the blue crab industry from the financial difficulties that its members felt would result from the new wage regulations. A research and development firm (The American Scientific Corporation of Alexandria, Va.) has been working under contract on the problem since October of that year.

The first step in the contractor's investigation was to survey the industry (Lee, Knobl, and Deady 1963a). As is evident from figure 3 (prepared by the contractor), blue crab plants are widely distributed along almost 2,000 miles of coastline in over 100 locations. The plants vary greatly in size, employing from 3 to more than 75 pickers, and vary also in the ways in which crabs are handled. In the multiple-flow sheet (fig. 4, developed from information collected during the aforementioned survey), the 15 vertical series of dots represent different sequences of handling in which the 28 possible suboperations--between the arrival of the live crabs at the receiving end of the plant and the movement of the final product from the shipping room--were observed in one or more of the plants surveyed.

PROGRESS TOWARDS SOLUTION: The factors of location, difference in size, type of operation, and economic condition of the individual firms greatly complicate the problems involved in providing some measure of economic relief. After the contractor made his survey, he concluded that several relatively inexpensive machines that could be used either independently or in combination would provide the flexibility in level of mechanization that the industry requires. Initially, however, because of the time required to develop machines of this type, the contractor suggested that a higher rate of production might be obtained through maximum utilization of the workers' skills. A plan for providing the industry some measure of immediate economic relief through worker specialization was discussed in a second report of the contractor's studies (Lee, Knobl, Abernethy, and Deady, 1963b).

At the present time, the contractor is working on the first of the proposed machines. This will, when perfected, clean the crab core and prepare it for extraction of the lump meat.

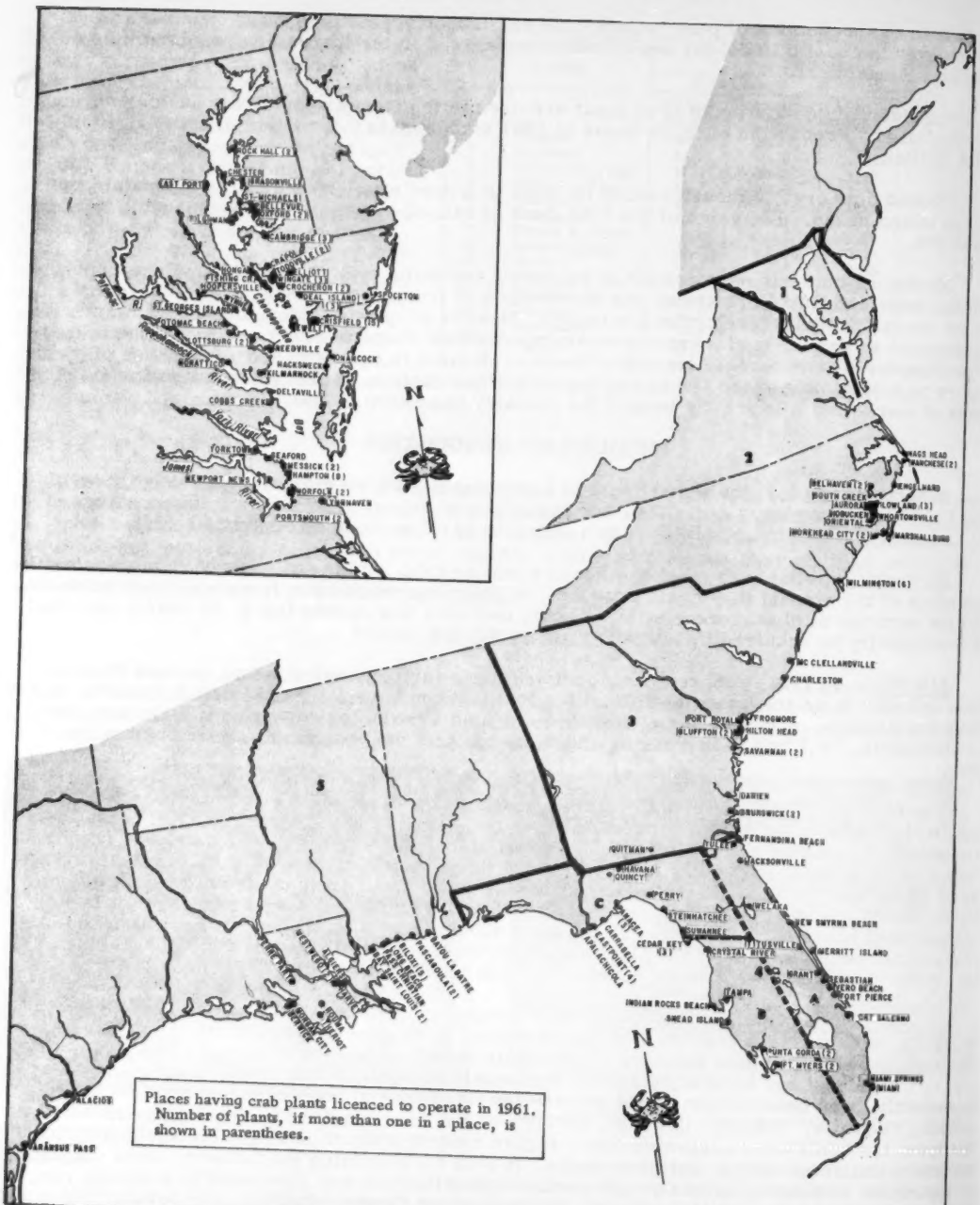

Fig. 3 - Crab-plant locations. The blue crab meat pack of the 1961 season was processed in over 170 plants scattered widely along the coastline from Upper Chesapeake Bay to Central Texas. Plants differed greatly in size and, as shown, were mostly located in or near small towns. Among the 106 plant sites shown are tiny fishing villages such as Frogmore, Deal Island, Toddville, Honga, and Fishing Creek. This scattered pattern of production greatly complicates the successful mechanization needed to restore the industry's economic well being.

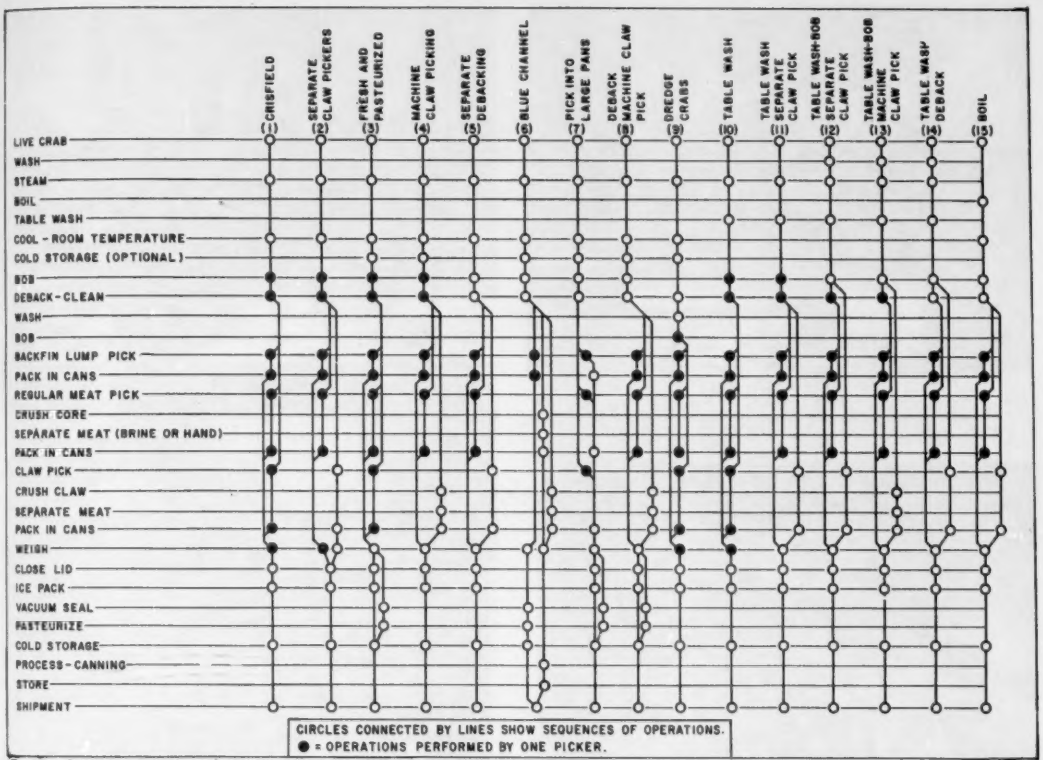

Fig. 4 - Various operation sequences. This chart, developed after a survey of the blue crab industry to determine the degree of mechanization needed, shows the 15 distinct and different handling patterns of 28 possible steps between live crabs and shipped meat that were observed in 65 plants studied.

The lump meat then can be removed manually or by a second machine that can be attached to the core-preparing device. A model of the lump picker has been fabricated and successfully tested.

To ascertain the production problems and the role that the machines now being designed may play, you will find it helpful to quickly view the industry by means of figures 5-40. The photographs were taken in 1960, the year just prior to the one in which the Fair Labor Standards Act went into effect. Although some of the plants have now shut down and a few others

Fig. 5 - Shown is a crab plant in Mississippi on Biloxi Bay. With few exceptions, crab plants are located on the waterfront.

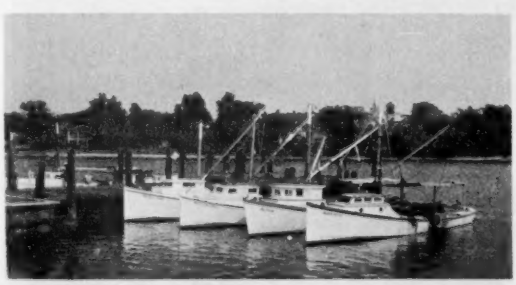

Fig. 6 - Some of the crab boats of lower Chesapeake Bay are relatively large. In most areas, however, crab fishing is a small-boat operation.

Fig. 7 - In the foreground are two of the more common types of crab boat. Many crabs are fished by one man in a boat powered with an outboard motor.

Fig. 8 - Crabs are hoisted from the boat in baskets or barrels and weighed. Crab fishermen are paid on the basis of the weight of catch. Most "crabbers" are independent, though they often have agreements to supply certain plants.

Fig. 9 - Although most plants are located on the waterfront, many of the larger plants truck crabs from other areas, sometimes hundreds of miles away, to supplement local production and to maintain a regular supply.

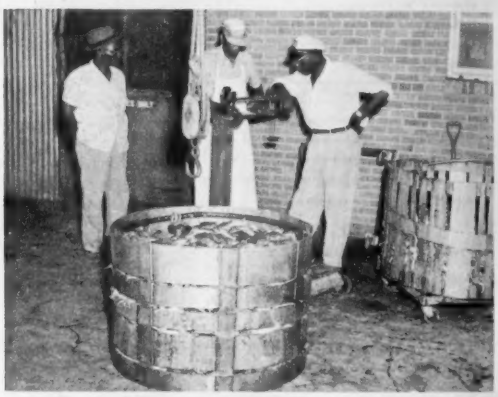

Fig. 10 - This plant uses circular retort baskets in which the crabs are cooked. Each basket holds 300 to 400 pounds of crabs.

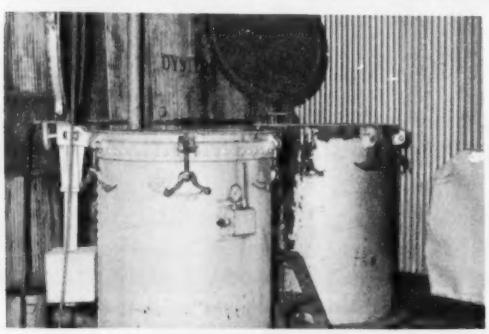

Fig. 11 - Vertical retorts for cooking the crabs are used in mos crab plants.

Fig. 12 - Other plants use horizontal pressure cookers. This cooker holds 4 of the wheeled steel-mesh carts.

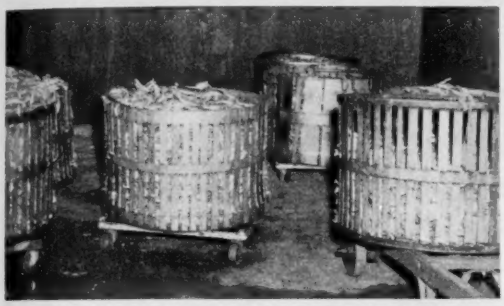

Fig. 13 - Cooked crabs are handled in many ways. Some Chesapeake Bay plants hold the baskets of crabs in a cooler overnight.

Fig. 14 - Many Gulf Coast plants deback the crabs as soon as they are cool. Here a hoist is lifting a basket until it can be tipped to dump the crabs onto the debacking table.

Fig. 15 - These workers are debacking or "bobbing" crabs. Claws are removed at the same time, as they are picked separately. The shell and viscera are discarded. Since the yield of crab meat amounts to only 12 to 15 percent of the weight of whole crab, disposing of the waste is a problem.

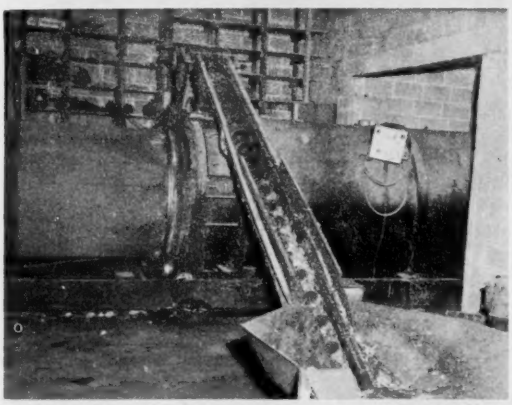

Fig. 16 - Many of the larger plants solve the problem of waste disposal by converting the waste into a salable product by use of a crab-scrap dryer. Waste from the debacking operation and the picking tables is dumped into the big hopper (foreground) and carried into the rotary dryer by means of a screw conveyor.

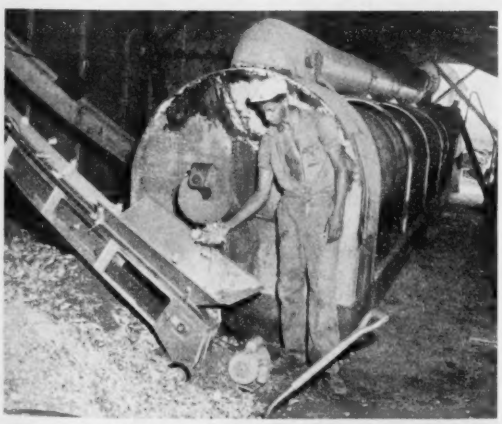

Fig. 17 - At the discharge end of another dryer, a worker is checking the scrap to determine if it is sufficiently dry for grinding.

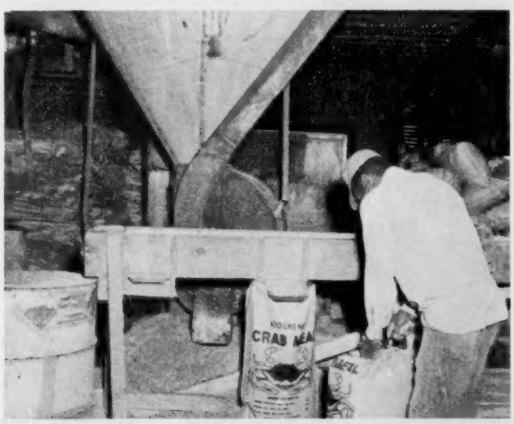

Fig. 18 - The scrap goes from the dryer to a hammermill, where it is ground to meal and bagged. The product is used in mixed feeds for chickens.

Fig. 19 - Returning to the main plant, we see debacked crabs being washed in flowing water.

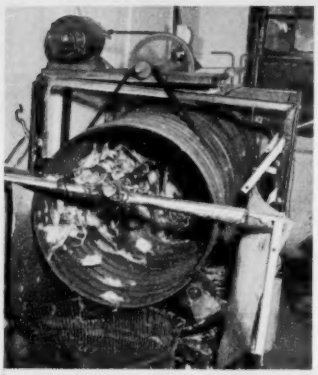

Fig. 20 - Some plants use rotary washer, for cleaning the debacked crabs.

Fig. 21 - This is a different type of rotary washer, used only for claws.

Fig. 22 - Here the debacked "cores" are washed by water sprays in an elevated flume and are transported to a basket at the end of the debacking table.

Fig. 23 - This is a crab-picking room after the daily cleanup. The cans are for the disposal of waste. In the Chesapeake Bay Area, crabs are usually cooked in the afternoon and cooled overnight. Pickers start work about daybreak.

Fig. 24 - Pickers work from baskets of crabs in this plant.

Fig. 25 - Picking blue crab is almost entirely a hand operation and requires a large force of skilled workers.

Fig. 26 - The cartilage is cut and the meat picked out with a special knife.

Fig. 27 - These pickers are working on claws, which are picked separately, since the technique is quite different from that for picking body meat.

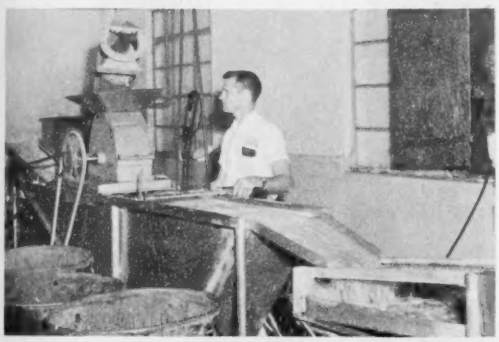

Fig. 28 - This is a patented crab-picking machine sometimes known as a claw cracker. The screw-conveyor elevates the claws to the hopper of a special type of hammermill. The broken pieces fall into a separation tank from which the meat floats off to an inspection-conveyor belt at the left. A U.S. Department of the Interior fishery inspector is observing the operation.

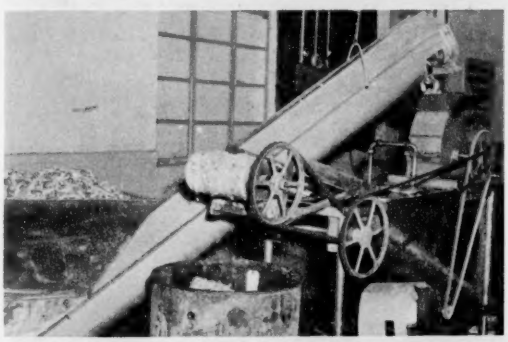

Fig. 29 - The shell fragments sink and are carried from the bottom of the tank by a conveyor belt, center foreground, from which they fall into a waste barrel. At left is the hopper heaped with crab claws feeding the screw-conveyor to the mill.

Fig. 30 - Workers check the machine-picked meat for residual shell. Note the gallon cans for packing. The product packed in gallon cans rarely reaches the retail market--it is used in mixtures such as deviled crab and crab cakes.

Fig. 31 - At the packing-room delivery window, the picker at left is bringing her pan of cans for credit. The pans in the foreground contain lids for three types of meat. Different production areas use a variety of descriptive names for the various grades or types of pack: backfin, special, white flake, regular, all lump, and so on. Basically, the types differ in the proportion the can contains of the large lump meat from the backfin.

Fig. 32 - This plant uses wheeled bins to ice and hold the packed meat after the weight has been checked and the cans capped.

Fig. 33 - Wooden barrels are commonly used to ship the fresh crab meat, well packed in ice.

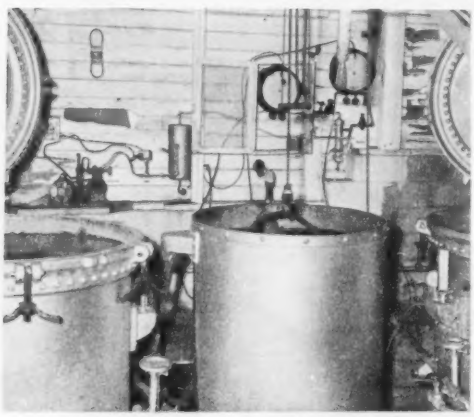

Fig. 34 - A sizable proportion of freshly picked crab meat is pasteurized and, for this process, must be packed in hermetically sealed cans. The sealed cans are placed in a steel autoclave basket and lowered into the open cooking tank. Gauges on the rear wall record the cooking time and temperature.

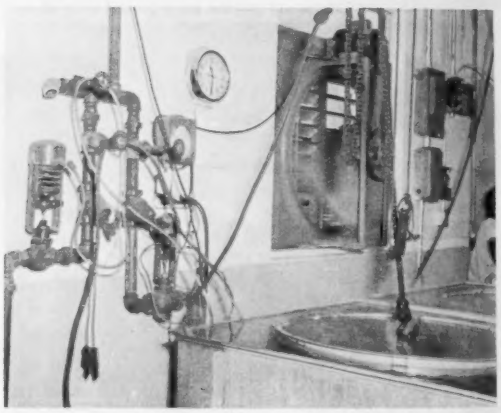

Fig. 35 - Time and temperature used in pasteurization must be carefully controlled to obtain desired keeping qualities without overcooking.

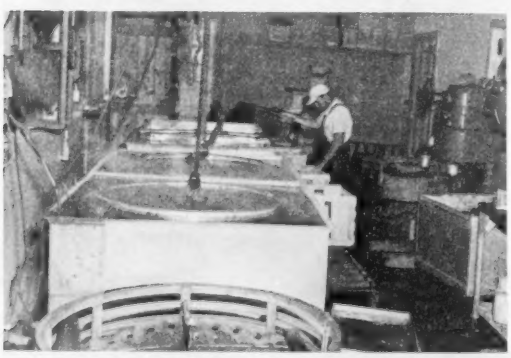

Fig. 36 - Open tanks can be used, since pasteurization temperatures are below boiling. Tanks in background are used to cool the cans of pasteurized meat.

Fig. 37 - The natural shell used by many producers of deviled crab comes from the regular picking operations. After being cleaned, the shells are laid on a table in the sun to dry.

Fig. 38 - Frozen "specialty products" containing crab meat are rapidly gaining in popularity. In the preparation of deviled crab, the crab mixture is molded into the natural shell and frozen before breading and packaging. This worker is removing the frozen crab product from the freezer tray.

Fig. 39 - The frozen shell-with-deviled-crab-mix is hand dipped in batter and breading and then is packed into boxes.

Fig. 40 - The institutional size box holds 12 to 18 crabs. Packing the crab in the natural shell results in an attractive product.

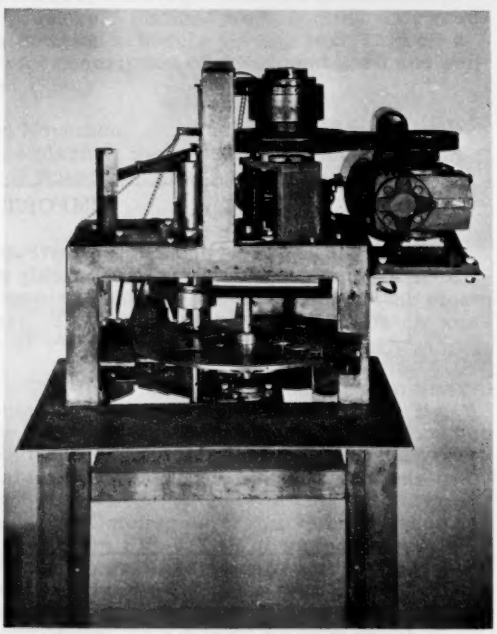

Fig. 41 - This small machine developed for the blue crab industry under contract with a research and development company will, when perfected, take whole cooked crabs and prepare cleaned cores ready for removal of lump meat at the rate of about 1 per second. The guards and the delivery and discharge chutes have been removed so that the working mechanism is open to view.

have made changes to increase efficiency of operation, this series of photographs is still quite typical of the industry in the early months of 1964.

Figure 41 shows the cleaning-debacking, core-preparing machine with guards, delivery, and discharge chutes removed so that the working mechanism is open to view. The contractor has expressed his belief that this machine, combined with the lump picker previously mentioned, will enable every plant to operate profitably even with a $1.25 hourly wage minimum.

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IMPORTANT NOTICE

Due to an unexpected mix-up in the mailing of the June 1964 issue of the magazine, there are probably a number of subscribers who did not receive that issue. If you are one of those who did not receive that issue, write us for a copy.

Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

REVIEW OF THE MOVEMENT OF ALBACORE TUNA OFF THE PACIFIC COAST IN 1963

By Glenn A. Flittner*

ABSTRACT

Troll catches by U. S. Navy radar picket vessels monitoring fixed, continuously-manned stations off the Pacific coast revealed the seasonal movement of albacore tuna (Thunnus alalunga Bonnaterre) in 1963. Inshore and northward migration of albacore in relation to sea surface temperatures is reviewed. Onset, termination of fishing at each station, and similarity of movement to the schematic migration model presented last year for 1962 is examined.

INTRODUCTION

In furtherance of the cooperative trolling program which was started in 1960, the U. S. Navy continued to log albacore catches in 1963 at each of its radar early warning surveillance stations off the west coast of the United States. As before, coverage extended from latitude 31° N. to 50° N. at a distance of 200-550 miles from shore. Stations were continuously manned by a fleet of several vessels participating in a rotation schedule placing each ship on a given station for 20- to 30-day intervals. (For a brief description of equipment used and general fishing strategy, see Flittner 1961 and Johnson 1960.)

Fishing commenced on April 1 and terminated November 1. When catch records indicated that a late-season flurry of activity might take place at the southern stations, vessels were asked to continue fishing through the months of November and December.

Table 1 - Date of First Albacore Catch and Water Temperature at U. S. Navy Radar Picket Stations, 1960-1963

Station Number and Year	Approximate Position		Date of First Catch	Water Temperature (°F)
	Latitude	Longitude		
I				
1960	49°N.	129°W.	(none caught)	-
1961	47°N.	130°W.	August 13	60
1962	50°N.	134°W.	August 6	62
1963	50°N.	136°W.	July 23	55
II				
1960	45°N.	130°W.	July 15	60
1961	43°N.	130°W.	July 7	63
1962	45°N.	135°W.	August 7	63
1963	46°N.	135°W.	July 23	58
3				
1960	40°N.	129°W.	July 10	58
1961	40°N.	133°W.	June 29	59
1962	42°N.	129°W.	July 6	59
1963	41°N.	134°W.	June 16	62
4				
1960	36°N.	128°W.	June 14	65
1961	35°N.	132°W.	June 17	64
1962	40°N.	133°W.	June 17	59
1963	36°N.	132°W.	July 17	65
5				
1960	32°N.	124°W.	June 5	62
1961	32°N.	124°W.	June 8	64
1962	35°N.	132°W.	June 11	59
1963	31°N.	129°W.	July 25	64
1/ 6				
1960	2/ x	x	x	-
1961	x	x	x	-
1962	30°N.	128°W.	July 19	64
1963	36°N.	124°W.	July 23	64

1/Fishing intermittent during season.
2/X - Station not fished.

RESULTS

The 1963 catch was the highest for any one year since inception of the program. A total of 1,041 albacore was taken by the picket fleet. The estimated weight of that catch was about 10,858 pounds, or 5.4 tons.

The first catch of the 1963 season was reported at Station 3 on June 16 (table 1, fig. 1). The appearance of albacore at that station was about 2 weeks earlier than in previous years. Fishing continued with few interruptions through the season, and the last catch was logged on October 4. Water temperatures ranged from 61°-62° F. at the beginning to 68°-69° F. at the termination of fishing. Albacore appeared at Station 4 on July 17, about 4 weeks later than a year prior, and were first taken at Station 5 on July 25, more than 6 weeks later than in 1962 1/. Stations 1 and 2 recorded their first catches of the year on July 23. Water temperatures at those locations ranged from 55°-58° F. at the commencement of fishing to a maximum of 64°-65° F. at the end of September.

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1/Comparisons are drawn with 1962 ship stations nearest to present stations, but 1962 locations, having the same numbers may differ from current positions by as much as 150 miles.

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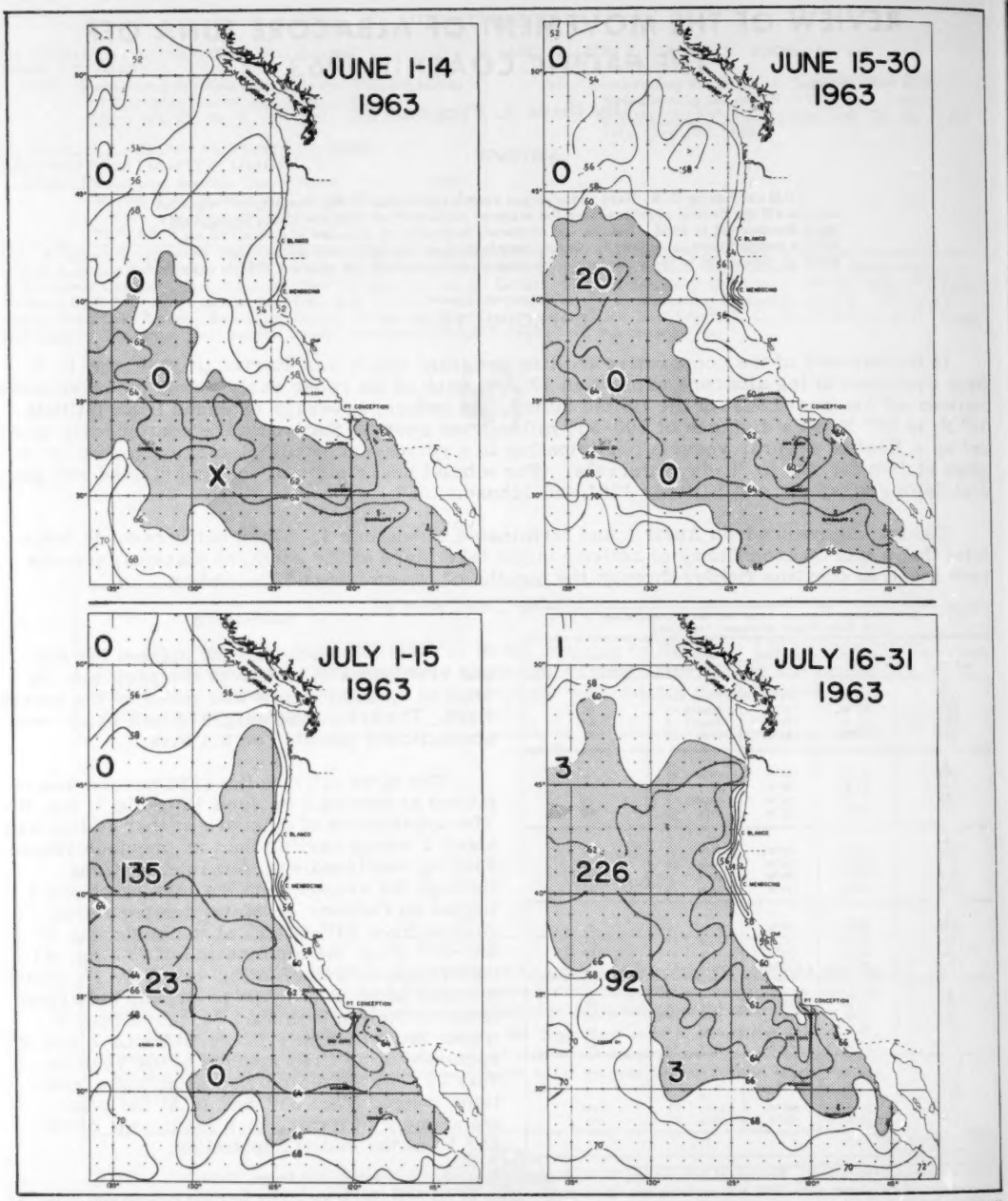

Fig. 1 - Albacore catch by U. S. Navy radar picket vessels in June-July 1963. Large numerals represent the catch at each station; small numerals indicate water temperature; and "x" indicates no fishing during the period. Shaded area delimits the 60°-66° F. temperature zone. More than two-thirds of the 1954-1958 California commercial albacore landings for June-September were taken from waters within those temperature limits.

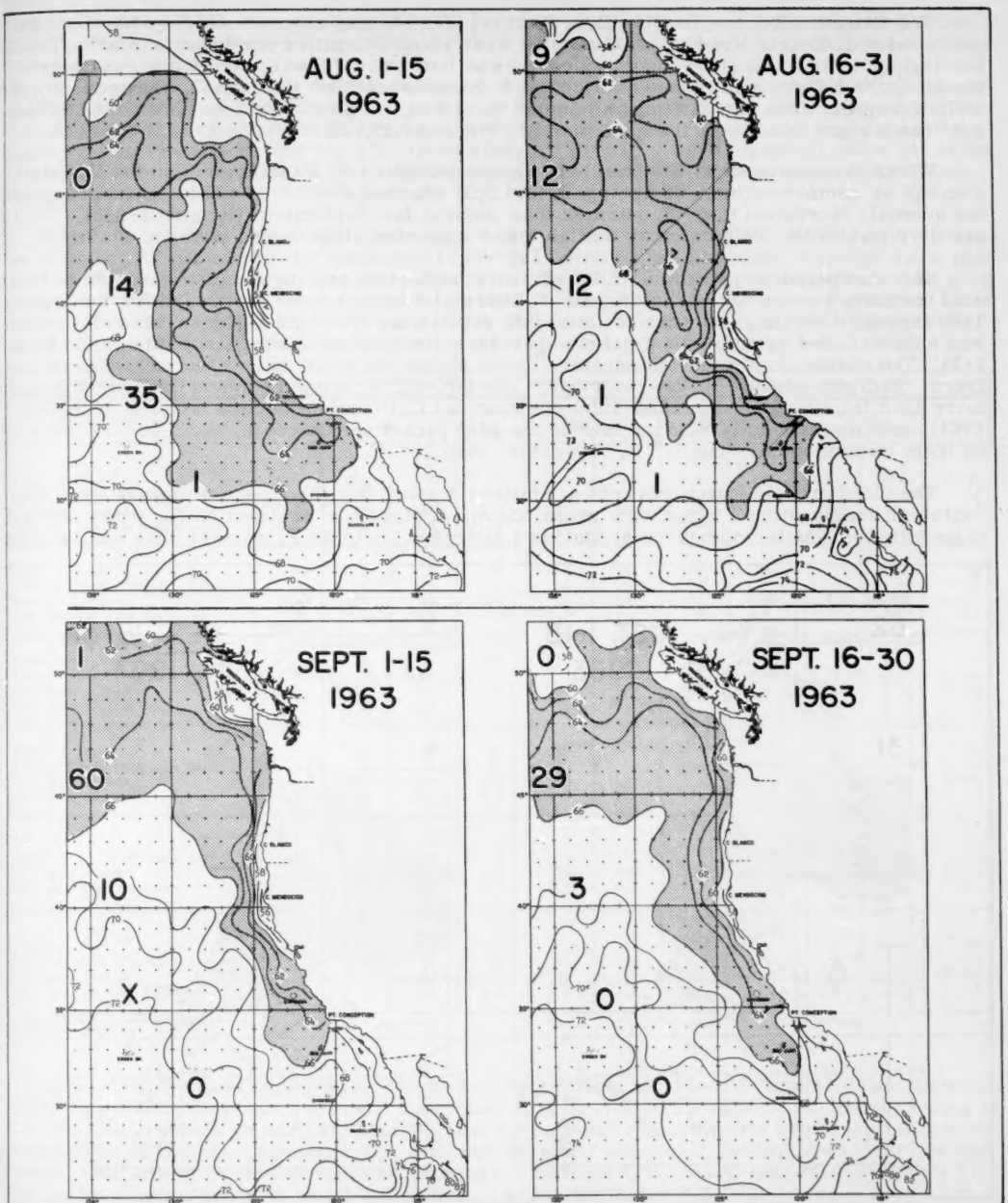

Fig. 2 - Albacore catch by U. S. Navy radar picket vessels in August-September 1962. Large numerals represent the catch at each station; small numerals indicate water temperature; and "x" indicates no fishing during the period. Shaded area delimits the 60°-66° F. temperature zone. More than two-thirds of the 1954-1958 California commercial albacore landings for June-September were taken from waters within those temperature limits.

The Oregon albacore trolling fleet first reported taking albacore on July 13, about 140 miles west of Heceta Head. Those catches were about 200 miles northeast of Station 3, substantiating indications from the early catches at that station that the northern extension of the albacore fishery was indeed as much as 2-3 weeks earlier than usual. Subsequently, Pacific Northwest albacore landings amounted to 11,868,978 pounds, which represented the largest catch since 1948, with the exception of 1959 when 13,542,804 pounds were taken[2/].

Water temperatures at Stations 1 and 2 averaged about 2° F. warmer than the long-term average at commencement of fishing in late July (Renner 1963a). As the season progressed, the anomaly increased to 4° F. warmer than normal for September (Renner 1963b). Fishing nearly equalled the 1962 catch at Station 1 and exceeded all previous years at Station 2.

The northward progression of the albacore population and its apparent relation to the annual northward extension of the 60°-66° F. thermal zone has been discussed for the years 1960 through 1963 in an earlier issue of this publication (Flittner 1963). This relationship was substantiated again by the catch-temperature distribution during the 1963 season (figs. 1-3). The shaded "optimum temperature" zone shows the rapid changes in sea surface isotherm configurations at 15-day intervals. The 60°-66° F. temperature range, which included more than two-thirds of the 1954-1958 commercial California albacore landings (Clemens 1961), encompassed fully 84.5 percent of the 1963 picket vessel catch. No albacore were taken from waters colder than 55° F. or warmer than 70° F.

The October 1-15 catch records at Stations 1 and 2 (fig. 3) appear to depart from the "optimum temperature" hypothesis given above. A plausible explanation for those catches is as follows: sea temperatures at Station 1 averaged up to 4° F. warmer than normal in Sep-

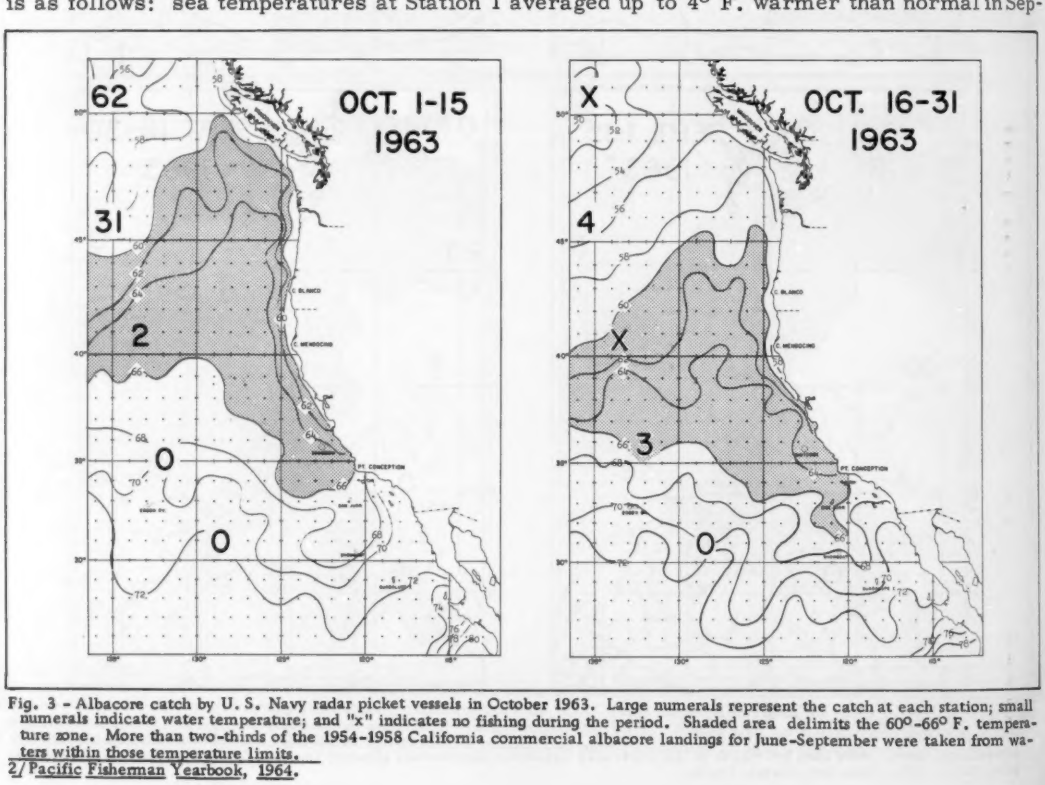

Fig. 3 - Albacore catch by U. S. Navy radar picket vessels in October 1963. Large numerals represent the catch at each station; small numerals indicate water temperature; and "x" indicates no fishing during the period. Shaded area delimits the 60°-66° F. temperature zone. More than two-thirds of the 1954-1958 California commercial albacore landings for June-September were taken from waters within those temperature limits.

2/ Pacific Fisherman Yearbook, 1964.

tember (Renner 1963b), whereas they were 3° F. colder than normal just 1 month later (Renner 1963c). The sharp 7-degree drop in sea surface temperature anomaly occurred in less than 30 days at more than two times the normal rate of cooling characteristic of the region at that time of the year. The vessel fishing on Station 1 reported having to stop all fishing operations on October 15 as a result of heavy weather from an intense storm system which had developed in the Gulf of Alaska. The upper mixed layer of the sea lost heat so rapidly as the storm system intensified that the schools of albacore probably were unable to move out of the region fast enough to avoid the suboptimal thermal conditions which were observed. Those changes are reflected in the 15-day charts (fig. 3).

Station 3 off Cape Mendocino again logged the highest total catch for the year. That area has produced 47 percent of the combined 1960-1963 catch for all stations. Catches were made on 32 of 46 consecutive days from June 16-July 31 in 1963 (table 2). Fishing was also good at Station 2 where catches were logged on 35 of 45 consecutive days between September 1 and October 15, thus establishing a new record for the area. Fishing was poorest at Station 5, where only 5 albacore were taken on 5 separate days during the entire season.

Table 2 - Albacore Catch and Effort Data for U.S. Navy Radar Picket Vessels Trolling on Station, June-October 1963

Station and item	Period										Totals
	June		July		August		September		October		
	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	
1											
Number of fish	1/0	1/0	0	1	1	9	1	1/0	62	2/x	74
Number of days fish were taken	0	0	0	1	1	2	1	0	12	x	17
Line-hours fished	18	32	448	512	737	861	168	108	589	x	3,473
Catch per 100 line hours	0.0	0.0	0.0	0.2	0.1	1.0	0.6	0.0	10.5	x	2.1
2											
Number of fish	1/0	0	0	3	1/0	12	60	29	31	4	139
Number of days fish were taken	0	0	0	2	0	6	14	9	12	4	47
Line-hours fished	0.0	424	304	256	0	1,221	2,321	513	1,116	456	6,611
Catch per 100 line hours	0	0.0	0.0	1.2	0.0	1.0	2.6	5.7	2.8	0.9	2.1
3											
Number of fish	0	20	135	226	1/14	1/12	10	3	1/2	2/x	422
Number of days fish were taken	0	7	10	15	3	3	3	1	2	x	44
Line-hours fished	368	714	814	787	44	114	860	944	184	x	4,829
Catch per 100 line hours	0.0	2.8	16.6	28.7	31.8	10.5	1.2	0.3	1.1	x	8.7
4											
Number of fish	0	1/0	23	92	35	1/1	2/x	1/0	0	3	154
Number of days fish were taken	0	0	6	14	11	1	x	0	0	1	37
Line-hours fished	930	192	424	1,054	910	437	x	84	2,696	1,273	8,000
Catch per 100 line hours	0.0	0.0	5.4	8.7	3.8	0.2	x	0.0	0.0	0.2	1.9
5											
Number of fish	1/0	0	0	3	1	1	0	0	1/0	0	5
Number of days fish were taken	0	0	0	3	1	1	0	0	0	0	5
Line-hours fished	18	564	577	763	814	649	1,198	612	138	600	5,933
Catch per 100 line hours	0.0	0.0	0.0	0.4	0.1	0.2	0.0	0.0	0.0	0.0	0.1
Totals											
Number of fish	0	20	158	325	51	35	71	32	95	7	794
Number of days fish were taken	0	7	16	35	16	13	18	10	26	5	150
Line-hours fished	1,334	1,926	2,567	3,372	2,505	3,282	4,547	2,261	4,723	1,729	28,846
Catch per 100 line hours	0.0	1.0	6.2	9.6	2.0	1.1	1.6	1.4	2.0	0.4	2.8

1/Station fished intermittently during period.
2/X - Station not fished.

Total fishing effort expended by the picket vessel fleet for June 1-October 31 amounted to 28,846 line hours, or about 8 percent less than in 1962 (table 2). Effort varied according to the individual vessels on station, weather, and operational commitments requiring temporary interruption of fishing. Consequently, although Station 3 was again the high producer for the season, total effort expended was less than that on Stations 4, 2, and 5, respectively (table 2). The seasonal average catch per 100 line-hours at Station 3 was 8.7 fish, whereas in 1962 the average for the same station was 6.6 fish. In both years, the average catch per 100 line-hours at Station 3 has exceeded the average combined catch of all stations by a factor of 3.

Although the peak of the commercial fishing activity occurred in September, the highest catches were recorded by Navy vessels during the July 16-31 interval (table 2). Catch per

100 line-hours averaged 9.6 fish. Highest catch rates were attained at Station 3, where during the July 16-31 period, 28.7 albacore were landed per 100 line-hours of trolling; 31.8 fish were taken per 100 line-hours in the August 1-15 interval[3/].

As in previous years, catch-effort data were tabulated for all stations up to October 31 in accordance with the original fishing time limit (April 1-October 31) set up at the inception of the trolling program in 1960. When the 1963 season appeared to persist much later than usual, the vessels occupying Stations 4 and 5 were asked to continue fishing. Those vessels were able to fish well into December before heavy weather swept away their trolling gear.

Evidence of late-season activity was noted in 1962 at 40° N., 133° W. where 16 albacore from 7-11 pounds were taken November 1 through 10. In 1963, 247 albacore were taken at Station 4 (36° N., 131° W.) between November 1 and December 17. Catches reached a peak in the November 1-15 interval and declined thereafter (table 3). The vessel on Station 4 reported losing an additional 40 albacore because of inclement weather and heavy seas between November 1 and 8. Station 5 produced no catch.

Table 3 - Albacore Catch and Effort Data for U.S. Navy Radar Picket Vessels Trolling on Station 4 during November and December 1963

Item	November		December		Totals
	1-15	16-30	1-15	16-31	
Number of fish	194	40	11	1/2	247
Number of days fish were taken	14	14	6	1	35
Line-hours fished	1,111	718	374	44	2,247
Catch per 100 line hours	17.5	5.6	2.9	4.5	11.0

1/ Station not fished entire period due to loss of fishing gear.

One noteworthy feature of the late-season catch is that for the second year the picket vessels apparently observed the offshore migration of the albacore population. Heavy commercial landings of small fish were reported at Monterey and Morro Bay during the week ending October 25. Catches declined in the November 1-15 interval, and bad weather terminated the fishery in the week ending November 22, coincident with the increased catches observed at Station 4.

The modal length of the November-December catch at Station 4 was 59 centimeters (23.2 inches, 9.5 pounds). No fish larger than 64 centimeters (25.2 inches, 12 pounds) were taken. Eight albacore were less than 40 centimeters long; the smallest, a 32-centimeter fish (12.6 inches, about $1\frac{3}{4}$ pounds), was caught November 22 in 68°-F. water.

Comparison of albacore movements in 1963 to last year's generalized schematic model of migration (Flittner 1963) demonstrated close agreement on the broad scale. Albacore entered the coastal region and turned north about 3 weeks earlier than in the preceding 3 years, whereas migration into southern waters was up to 6 weeks later than usual. Onshore and northward movements appeared to follow the model and were limited by the distribution of "optimum" sea temperatures. The development of a good nearshore fishery in Central California and Oregon waters came early in July (fig. 1) and persisted through October as favorable sea temperatures developed in a narrow north-south zone well within reach of the albacore fishing fleet (figs. 2-3).

U.S.S. Picket carried off the honors in total catch for the second consecutive year: 360 albacore were landed of a grand total of 1,041 fish for all vessels combined; of that total, 357 were taken on Station 5 in a single patrol (fig. 4). U.S.S. Scanner was second highest vessel with a total catch of 284 albacore. Picket logged the highest catch in one day at Station 5 on July 19 when 52 albacore were taken; 46 had been caught on the previous day. Scanner landed 42 fish on November 12 at Station 7, and took 33 albacore 2 days later.

3/ Although the effort expended on the station was minimal during this time, fishing occurred at intervals throughout the entire 15-day period. Fish were taken on each day the lines were out.

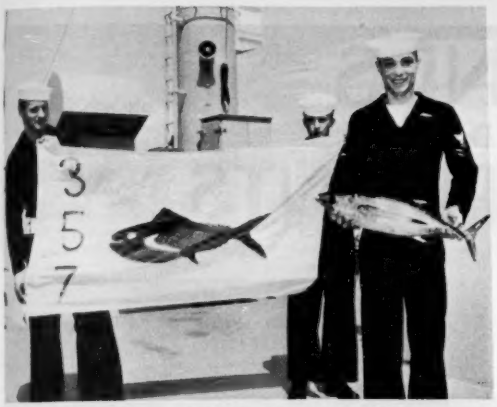

Fig. 4 - Men of the U.S.S. Picket display a sample of their record catch made on a single patrol at Station 5.

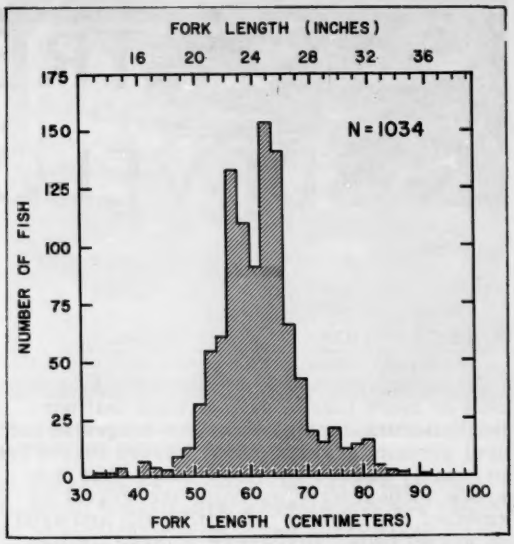

Fig. 5 - Length-frequency distribution of albacore taken by U. S. Navy radar picket vessels trolling on station, June-December, 1963. All stations combined.

Age-group representation of the 1963 picket vessel catch was similar to 1962. The 22-inch group (56 cm.) comprised 42 percent of the catch, whereas the 25-inch group (62-64 cm.) made up about 48 percent of the total (fig. 5). The remainder of the catch consisted of very small fish (about 2 percent) and fish 30 inches or longer (about 8 percent). The largest fish taken was a 36-inch, 34-pound albacore which was caught on July 23 at Station 1.

For the fourth consecutive year, distribution and availability of albacore off the U. S. west coast exhibited a striking correlation with prevailing sea surface temperatures as revealed by the 15-day charts prepared by the Biological Laboratory, San Diego. The rapid northward progression of the "optimum temperature" zone with the advance of each summer season offers substantial evidence concerning one of the factors bringing about the rapid seasonal shifting of the centers of albacore abundance.

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1963c. California Fishery Market News Monthly Summary, October 1963; Part II - Fishing Information, 2 pp., 6 figs.

Note: Personnel of Radar Picket Squadron One are again to be congratulated for their participation in a cooperative program which has proven its worth to fishery scientists and to the albacore fishing industry, and has provided recreation to the picket vessel crew members. Tuna research workers and albacore fishermen alike are grateful to the officers and men of the squadron for their continued and enthusiastic participation in the trolling program.

TRENDS AND DEVELOPMENTS

Salmon

ABERNATHY SPAWNING CHANNEL PROVES EFFECTIVE FOR REPRODUCTION OF CHUM SALMON:

Manmade spawning channels are being developed as a method of reducing the 90 percent or more loss of salmon eggs that normally occurs during incubation stages in natural stream gravel. These severe losses are primarily caused by flood water that may erode incubating eggs from the gravel or smother the eggs by depositing silt and sand on gravel beds. Discovery of these limitations to salmon production has led to an attempt to create a controlled environment with graded permeable gravel and regulated flow of water with depths and velocity that would be optimum for the spawning and incubation of salmon. Not only has survival proven superior to that from natural streams under those conditions, but it is believed that the fry produced are as viable as fry produced in natural streams. This ability to compete and survive in the natural environment should result in good adult returns.

Egg-to-fry survivals in established spawning channels are exceeding survivals in natural streams by a significant margin and in some cases have reached maximum levels of over 90 percent. Because of their recent development, a reliable measure of adult returns has not been obtained for most spawning channels. Figures, however, are available from the Jones Creek channel in British Columbia where returning adult pink salmon have progressively increased from 400 to 5,000 in four generations.

Results in the Abernathy spawning channel are also encouraging. This 1,800-foot long channel (see figure), located on a tributary of the lower Columbia River, was constructed in 1959 by the U.S. Bureau of Commercial Fisheries. Method for operating the channel to achieve maximum production of young salmon and returning adults are now being developed.

The Abernathy spawning channel.

With one exception, the environment created in the Abernathy channel has been adequate for the successful incubation of chum salmon eggs. Deposition of sediment from the water supply as it moved through the channel has made it difficult to maintain the original permeable condition of the streambed gravel. Removing and screening the gravel in the channel provided a temporary solution to this problem. A more permanent solution will be attained with a settling basin which will remove silt and sand from the water supply before it enters the channel. With control of the sediment, the Abernathy spawning channel shows promise of providing conditions for achieving good egg-to-fry survival.

Survival studies at Abernathy are being conducted mainly with plants of eyed eggs, but some information has also been obtained with plants of green eggs and with natural spawning. Excellent survival (75-95 percent)

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Chum Salmon Egg-to-Fry Survival in the Abernathy Spawning Channel

Type of Deposition	Year	Number of Eggs Deposited	Number of Fry Produced	Percentage Survival
Plants of eyed eggs	1960/61	250,000	229,610	91.8
	1961/62	600,000	572,895	95.5
	1962/63	1,185,000	891,849	75.3
Plants of green eggs	1962/63	27,860	24,461	87.8
Natural spawning	1962/63	54,156	44,452	82.1

was observed for all three methods of egg deposition (see table). These consistent results have demonstrated that the Abernathy channel will yield maximum survival of chum salmon fry. With the development of an adult run adequate in size to fully utilize the facilities at Abernathy, such a channel can make a significant contribution to the chum salmon population of the Columbia River.

--Richard Bakkala, Fishery Biologist (Research),
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Design and Operation of a Tray Rack for the Study of Oysters

As a result of the serious oyster mortalities which occurred along the east coast of the United States since 1957, the U. S. Bureau of Commercial Fisheries initiated a study of these mortalities at its Franklin City Field Station on Chincoteague Bay, Va. A major portion of this research involved maintaining oysters of several age groups from various geographic regions for routine observation over a period of 5 to 7 years. To prevent destruction by predators and smothering from silt and algae, it appeared desirable to support the oysters off the bottom in trays suspended from a permanent platform readily accessible to the laboratory. This report describes the design and operation of the structure, which we have called a tray rack.

The rack (fig. 1) was erected adjoining an existing pier. Creosote-treated pilings 30 feet in length were driven 12 feet into the bottom to form the supporting frame of the structure. The walks, superstructure, and braces were made of 4 x 6 and 2 x 8-inch creosote-treated lumber. The structure consists

Fig. 1 - Overall view of tray rack showing construction of walks and position of superstructure.

of six catwalks, 3 feet wide and 26 feet long, fastened to stringers which in turn are attached to vertical pilings. The walks stand 4 feet above a mean low water depth of 5 feet and border five bays 26 feet in length and 11 feet wide. Each bay holds 16 trays, each tray being suspended from the walk by a single line and bridle. Twelve additional trays could be suspended from the outside of the two outer walks making it possible to accommodate a total of 92 trays.

A block and tackle, which travels on a monorail suspended from the overhead structure,

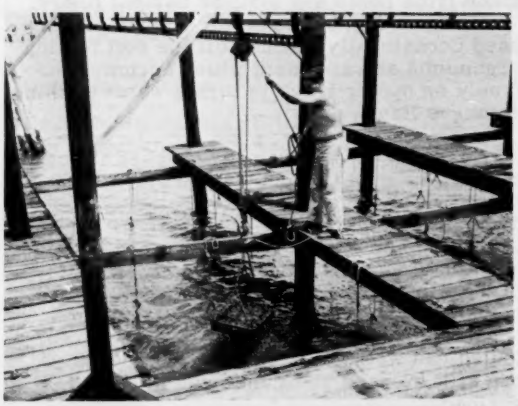

Fig. 2 - Photograph of monorails, movable block and tackle, and chicken wire cover arrangement of bridle on tray.

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is used to lift the trays out of the water and to transport them to the pier (fig. 2). The monorail tracking system is of the type used in the meat-packing industry. The tackle consists of a double and a single four-inch steel block swivel mounted and strung with $\frac{5}{8}$-inch rope. The superstructure rises 8 feet above the walks and adjoining pier and projects over the pier so that trays may be loaded on a flatbed handtruck for transport into the laboratory. The tracks and other metal parts are painted with "Esso Surett Fluid 30" to lubricate and prevent rusting.

The first trays employed in this study were constructed of woven steel rods, and were 40 inches long, 20 inches wide, and 4 inches deep. Later those were replaced with lighter trays of approximately the same size constructed of expanded steel welded to steel rods. To reduce corrosion the trays are dipped in hot roofing tar once or twice a year. Chicken wire ($1\frac{1}{2}$-inch mesh, 18 gauge) is used to cover the trays to prevent loss of oysters. Bridles on the trays are constructed of $\frac{3}{16}$-inch welded link chain fastened with lap links or "S" hooks. It was found that the less expensive ungalvanized chain showed no more corrosion or wear than galvanized, and "S" hooks showed less wear than the more expensive lap links. Polypropylene ropes of $\frac{3}{8}$-inch diameter are attached to the tray bridles and secured to cleats on the sides of the walks. This synthetic rope is not destroyed by marine bacteria in sea water and is thus preferable to rope made from hemp and similar natural fibers. Water from a gasoline motor-driven pump is used occasionally to flush off the soft fouling organisms and sediment which accumulates freely on oyster trays in turbid water in Chincoteague Bay.

As designed, the tray rack makes it possible for one man to handle the trays with a minimum of effort and little chance of accident. In addition, trays are easily lifted with the tackle and carted indoors for observation and study, an advantage of particular benefit in the winter in temperate latitudes. In Chincoteague Bay fouling by sessile organisms accumulates rapidly. A tray of oysters so fouled can weigh in excess of 300 pounds yet can still be handled by the system here described.

After a year of operation, we find this tray rack functional, efficient, and timesaving.

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U. S. Bureau of Commercial Fisheries,
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1/Present address: Michael Castagna, Scientist-in-Charge, Eastern Shore Marine Laboratory of the Virginia Institute of Marine Science, Wachapreague, Virginia.

Note: I wish to acknowledge the technical assistance of Paul Heister, maintenance man at the Bureau's Oxford Laboratory, in the design and construction of the structure described here.

Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA:

U.S.S.R.: Soviet trawling activity off the coast of Alaska declined gradually throughout September. By the end of that month the fleet had decreased to less than 25 vessels. That fleet had been fishing from southwest Kodiak east to the vicinity of Ocean Cape off Yakutat. It appeared that the Soviets were continuing to fish for Pacific ocean perch, with little take of incidental species.

Two Soviet whaling fleets continued to operate off Alaska throughout September. One fleet worked south from the vicinity of the Pribilof Islands to south of Unimak Pass. The second fleet was whaling along the western Aleutian Chain generally in the vicinity of Amchitka Pass.

Japan: The Japanese fisheries off Alaska also declined in September as various fleets filled their catch quotas and sailed for their home ports. Two fish-meal fleets departed for Japan as the month drew to a close and both king crab fleets departed Bristol Bay about the middle of the month.

Two Japanese shrimp fleets continued to operate north of the Pribilof Islands group. The one remaining fish-meal fleet fishing in the same general vicinity was scheduled to depart shortly. A fish-meal-freezer factoryship fishing south of the Pribilofs was also expected to cease operations in the near future.

Four large new Japanese stern trawlers and two smaller side trawlers continued fishing for shrimp and Pacific ocean perch in the vicinity of southwest Kodiak Island in the Gulf of Alaska during September.

* * * * *

ALASKA SALMON PACK IN 1964:

The final 1964 weekly salmon pack report of the Alaska Department of Fish and Game

Fig. 1 - Longshoremen guiding a slingful of cases of canned salmon shipped from Alaska at a dock in Seattle.

showed the Alaska salmon pack at 3,509,400 standard cases (48 1-lb. cans). This was an increase of 853,391 cases or 32 percent as compared with the 1963 salmon pack of 2,656,009 cases.

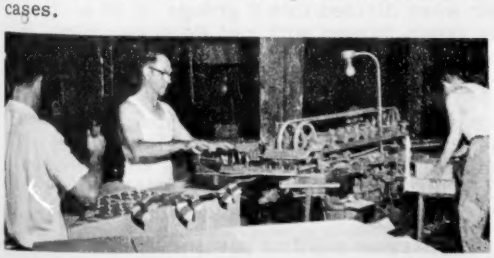


Fig. 2 - Inside a warehouse at Seattle, Wash., labelers unpack cans of unlabeled Alaska salmon onto a conveyor for labeling.

Central Alaska, with a total of 1,721,000 cases was the highest producer, while Southeastern and Western Alaska packed 1,225,300 cases and 563,100 cases, respectively. The Kodiak area was the highest in the State with 633,250 cases. The Ketchikan area was second with 580,000 cases, and Bristol Bay was third with 535,450 cases.

Pink salmon accounted for 1,903,000 cases or 54 percent of the total pack followed by red, 720,300 cases or 21 percent; chum, 689,000 cases or 20 percent; coho or silver, 155,300 cases or 4 percent; and king, 41,800 cases or 1 percent.

* * * * *

HALIBUT FISHING SEASON IN AREA 2 CLOSES:

The 1964 North Pacific halibut fishing season in Area 2 closed on September 15 and for the second straight year the catch quota was not attained. Regulations of the International Pacific Halibut Commission provided that halibut fishing in Area 2 (from Cape Spencer, Alaska, to Willapa Bay, Wash.) would close on that date or earlier if 25 million pounds of halibut were taken. A total halibut catch of 21 million pounds was expected by the time fishing stopped on statutory closing date. Last year (1963) was the first year since the Commission assumed control of the halibut fishery that the Area 2 season closed without attainment of the catch quota (28 million pounds in 1963). The catch in Area 2 totaled 25 million pounds in 1963.

* * * * *

GEAR MARKING EXPERIMENTS:

In conjunction with United States efforts to minimize gear conflicts in the Gulf of Alaska between domestic and foreign vessels, tests of gear-marking devices for possible use in the king crab fishery were conducted aboard the U. S. Bureau of Commercial Fisheries research vessel John R. Manning in the Kodiak Island vicinity. Four different types of passive radar reflectors, in combination with 2 flotation devices and 3 different poles, were tested. A variety of weather and sea conditions during the period provided the opportunity for observation of the markers in situations comparable to those which might reasonably be expected in actual use with the commercial fishery.

The results of preliminary tests were encouraging. Two of the reflectors gave prom-

ising results under all sea conditions encountered during the tests. Maximum distances at which the reflectors could be observed, using shipboard radar, were $4\frac{1}{4}$ miles under "good" weather conditions and $2\frac{3}{4}$ miles under adverse conditions.

Plans were to alter the most promising reflector buoys with the goal of increasing the effective range, and subsequently to assist certain key fishermen in testing and evaluating the markers under operational conditions.

* * * * *

SOUTHEAST ALASKA
HERRING CATCH MODERATE:

The commercial herring reduction fishery ceased operations in early September 1964, after what the industry termed a "moderately successful" season. Only 23,500 tons of a 35,000-ton herring catch quota were taken. The catch was composed of about 50 percent age VI fish and 11 percent age VII fish. No younger age classes seemed strong at the time.

* * * * *

KING CRAB LANDINGS LOW AT KODIAK:

Returns of king crab tagged by the U. S. Bureau of Commercial Fisheries in its studies near Kodiak were few, as of the end of September 1964, and indicated a lower fishing effort than in 1963. This is because full king crab processing had not yet been re-established in Kodiak since the earthquake. On the Peninsula, however, processing was reported to be in high gear and another large annual pack was anticipated.

A full load of king crabs at Kodiak, Alaska.

Alaska Fisheries Explorations and Gear Development

CHARTER OF VESSEL
"PARAGON" TERMINATED:

With the completion of Cruise 64-2 (June 16-September 19, 1964) in the Gulf of Alaska and Bering Sea, the exploratory fishing vessel Paragon, chartered by the U. S. Bureau of Commercial Fisheries, terminated over 4 months of charter to the Bureau. The results of explorations by that vessel will allow for more detailed evaluation of the Gulf of Alaska shrimp resource.

Note: See Commercial Fisheries Review, November 1964 p. 17.

Alaska Fishery Investigations

SOCKEYE FRY AVAILABILITY
LOW DURING SUMMER:

Widely separated studies involving summer sampling in Coville Lake with tow nets and a roundhaul seine in Auke Lake showed July-September declines in sockeye fry availability of 90 percent in Coville and 70 percent in Auke Lake for 1964. The Coville study also shows that for both 1963 and 1964 there were probably heavy mortalities of sockeye fry in early June, a stable period of low mortality in mid-summer, and another period of high mortality in late August.

* * * * *

NEW ADULT PINK SALMON RUN
TRANSPORTED INTO SASHIN CREEK:

A vessel equipped with tanks for live fish was used to transport adult pink salmon from Bear Harbor, Kuiu Island, to Sashin Creek, Little Port Walter. A total of 1,866 pink salmon (including 1,139 females) were released above the weir and 150 males were released below the weir. Those released below the weir were divided into 3 groups of 50 each. One group, tagged with red Petersen discs, was released from the floating pound in Little Port Walter Bay. The second group, tagged with white discs, was released below the weir without being held in Sashin Creek. The third group, tagged with yellow discs, was held in Sashin Creek 4 days and released below the weir. About 40 of the 150 tagged fish passed upstream through the weir.

The largest number passing upstream originated from the group held 4 days in Sashin

Enumerating pink salmon fry on their outmigration at Sashin Creek, Little Port Walter, Southeastern Alaska.

Creek, and the smallest number from the group released in the bay.

There was no evidence of fish dying unspawned, and spawning occurred through the 0.6-mile length of spawning ground. Spawning density was highest in the lower 0.4-mile section, however. The transplant study was conducted cooperatively with Alaska Department of Fish and Game biologists and a privately-owned packer vessel. The results may demonstrate a feasible technique for increasing salmon production in Alaska.

American Fisheries Advisory Committee

RECOMMENDATIONS MADE AT MEETING IN NEW ENGLAND:

At a three-day meeting held in Danvers, Mass., this October (1964), the American Fisheries Advisory Committee recommended that greater emphasis be placed on programs of research and management of fishery resources, improving product quality, and development of new fishery products. It also suggested that a training program be started for commercial fishermen as a means of encouraging young people to enter the fishing industry. The Committee, which is responsible for advising the Secretary of the Interior on general fishery matters, made a number of other major recommendations.

Another recommendation by the Committee urged continuation of efforts to resolve differences between sport fishing and commercial fishing interests in both fresh-water and salt-water fisheries resources. The Committee pointed out that both groups face common problems, and solutions will require concerted efforts by both.

Other actions taken by the Committee were:

1. Endorsed provisions of the Fishing Fleet Improvement Act which calls for new fishing vessels to be of advance design, and that economic injury to existing fleets be avoided insofar as possible.

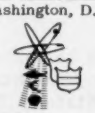
2. Recommended that the fishing industry and the Federal Government take full advantage of the Federal fisheries legislation enacted in the 88th Congress.

3. Endorsed the new Commercial Fisheries Research and Development Act as a means of providing maximum opportunities for further development of commercial fisheries at state levels.

At the meeting, representatives from the U. S. Bureau of Commercial Fisheries discussed programs of the North Atlantic Region. Highlights included the Bureau's research on quality of fresh and frozen fish; new and more efficient fishing vessels and gear; and biological and oceanographic programs seeking improved knowledge of fisheries resources. Other matters discussed included the problem of heavy fishing pressure by foreign fleets off the New England coast; the recently passed Fishing Fleet Improvement Act; and economic factors affecting the New England fishing industry.

The Advisory Committee visited the new and recently dedicated Marine Products Irradiator at Gloucester, Mass. This facility (which was constructed by the Atomic Energy Commission) will be operated by personnel of the U. S. Bureau of Commercial Fisheries, and is the first food irradiation plant in the world devoted entirely to fishery products. Members of the Committee also toured major fish processing plants in the Gloucester area.

The next meeting of the American Fisheries Advisory Committee will be held in Washington, D. C., in the spring of 1965.



American Samoa

TUNA FLEET AS OF AUGUST 31, 1964:

A total of 33 tuna fishing vessels was reported to be fishing out of American Samoa as of August 31, 1964. They consisted of vessels from the following countries: Japan--20; Taiwan (Formosa)--7; Republic of South Korea--5; and Okinawa--1. An additional six 140-ton class tuna vessels from South Korea were expected to join the Samoan fleet after October 10. The six vessels were constructed in Japan. (Suisan Keizai Shimbun, September 26, 1964.)

Aquatic Weeds

USE OF GRASS CARP FROM MALAYSIA TO FIGHT WATER VEGETATION IN PONDS:

A species of fish known as grass carp found in Malaysia is reported to be almost completely herbivorous, preferring a diet of grass and other water vegetation rather than subsisting on insects and competing fish. The U. S. Department of the Interior announced this past September that 27 small specimens of these grass carp were imported into the United States from Malaysia in 1963 for propagation experiments and study of their feeding habits. They are being studied at experimental ponds managed by the Bureau of Sport Fisheries and Wildlife at Stuttgart, Ark. If their propagation in this country is successful, they may eventually be the means to help fight vegetation in the thousands of farm ponds where production of game fish is restricted by excessive weed growth.

In selecting this carp, scientists point out that excessive vegetation in farm ponds provides too much escape cover for small fish, which are the main source of food for larger fish. Heavy weed growth also impedes navigation and the harvest of desirable fish species. Herbicides could be used to eliminate weeds, but that approach is considered too costly and also might prove hazardous to fish. For those reasons it was decided to experiment with the test group of imported grass carp.

The Bureau says it has much to learn about the species before it would recommend its use in the United States. Even if the grass carp proves its worth at keeping vegetation out of test ponds, its ability to reproduce will be studied in carefully controlled experiments. The Bureau also wishes to know the effects the grass carp would have on other species of fish and on desirable waterfowl foods.

The Chief of the Fish Farming Experimental Station at Stuttgart said Malaysian fishery scientists report they have been unable to spawn grass carp in ponds there. He believes spawning might be induced by adding fresh water to the test ponds and by injecting hormones, if necessary. He said, "Up until 15 years ago it was believed impossible to spawn our native buffalofish in ponds, but the introduction of fresh water into ponds resulted in successful spawning." Fishery scientists are not sure why the introduction of fresh water will help induce spawning. Some think it may give the fish confidence that there will be an adequate water supply for the survival of their young.

The 27 specimens of grass carp at Stuttgart are the survivors of 70 fingerlings sent to the experiment station by air in plastic bags last year by the Malaysian Director of Fisheries.

The fingerlings, then less than an inch long, survived their trip and were divided among indoor aquaria and an outdoor pond. They were fed fish meal and canned spinach during the winter. About half the indoor group survived; only one in the outdoor pond was lost. The survivors are now about 16 inches long and weigh about two pounds each. They are fed high-protein fish meal, supplemented occasionally with a handful of grass.

The grass carp has smaller scales and a more elongated body than its cousin, the German carp, which was imported and introduced to the United States nearly a century ago as a food fish, but is not thought of very highly by sport fishermen. The German carp reproduces rapidly, muddies water, and retards the growth of plants needed for oxygen replenishment of water and competes for food with some species more desired by sportsmen. If the grass carp begins displaying any of those traits, it will be rejected by the Stuttgart researchers. The grass carp is said to be active and might be a good game fish. As far as is now known, it does not feed on other fish.

A report from England said 15,000 grass carp are being used successfully to prevent weeds from clogging water inlets at an electric power station at Barrow-in-Furness. British scientists have not yet learned if the fish will spawn there.

California

PETRALE SOLE MIGRATION STUDIES AND TAGGING:

M/V "N. B. Scofield" Cruise 64-S-4-Bottomfish (July 21-August 20, 1964): To locate and tag petrale sole (Eopsetta jordani) for migration and subpopulation studies was the principal objective of this cruise in the coastal waters off Shelter Cove, Bodega Bay, and Ventura, by the California Department of

Fish and Game research vessel N. B. Scofield. Secondary objectives were to tag sharks in cooperation with the American Institute of Biological Sciences and the U. S. Fish and Wildlife tagging program, and to collect specimens for specific studies.

All tagging on this cruise was conducted in the vicinities of Shelter Cove and Bodega Bay using commercial otter trawl gear. A total of 2,864 petrale sole was tagged and released in water shallower than 65 fathoms. The fish were caught during 95 tows, each of which lasted from 20 to 30 minutes. The condition of the fish taken from and released in shallow water was excellent.

A total of 43 tows was made in the Shelter Cove area and yielded 1,664 petrale sole for tagging. About 60 percent of those fish were of commercial size (greater than 11 inches), and were available in commercial quantity. The remaining 52 tows were made in the Bodega Bay area where 1,200 petrale were tagged. Although 99 percent of the Bodega Bay fish were of commercial size, they were less abundant than in the Shelter Cove area.

Returns from this tagging effort will give valuable information about summer migrations of petrale sole stocks, as well as additional growth data. A few tagged petrale sole were recaptured by the commercial fishing fleet before the cruise ended.

Five male dogfish shark (Squalus acanthius) were tagged and released in the Shelter Cove area. Two red Peterson disc-type tags printed in English and Spanish were secured on either side of the first dorsal fin with a stainless steel pin.

Specimens of English sole (Parophrys vetulus), petrale sole (Eopsetta jordani), Dover sole (Microstomus pacificus), rex sole, Glyptocephalus zachirus), and curl-fin turbot (Pleuronichthys decurrens) were collected for systematic studies at the California Academy of Sciences.

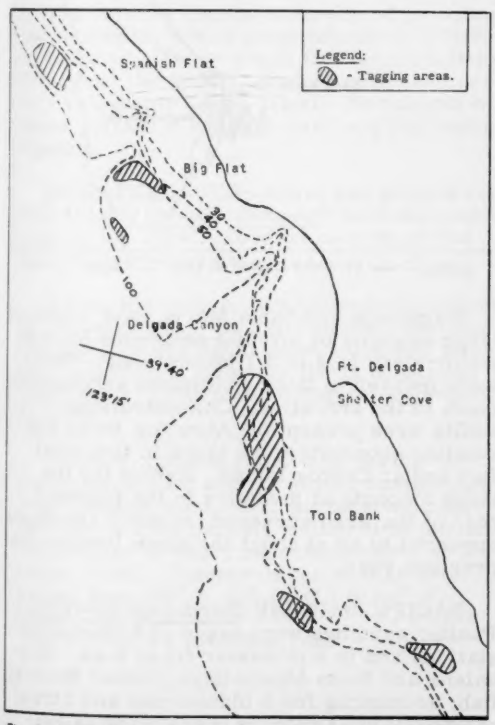


Fig. 1 - Shows Shelter Cove tagging area, N. B. Scofield Cruise 64-S-4-Bottomfish (July 21-August 20, 1964).

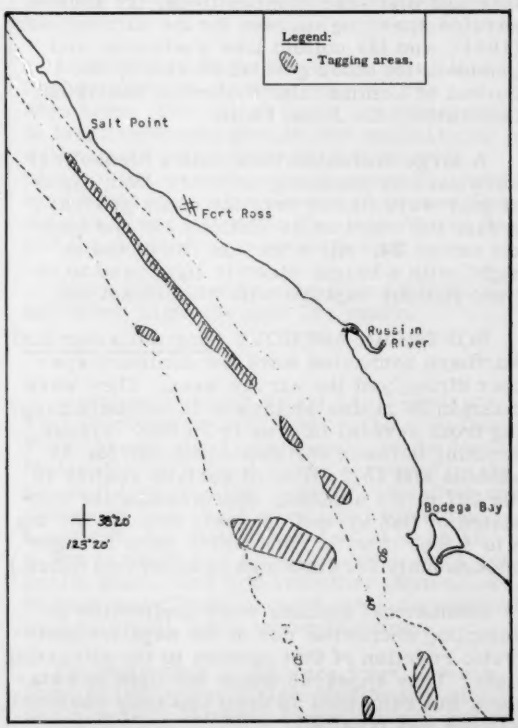


Fig. 2 - Shows Bodega Bay tagging area, N. B. Scofield Cruise 64-S-4-Bottomfish (July 21-August 20, 1964).

It had been planned to tag Pacific halibut (Hippoglossus stenolepis) with operculum tags but none were caught during the cruise. The halibut tagging project is in cooperation with the International Pacific Halibut Commission.

Three tows were made in the Ventura area to collect juvenile California halibut (Paralichthys californicus) for the California Department of Fish and Game's sportfish project at Terminal Island, but none was caught.
Note: See Commercial Fisheries Review, February 1963 p. 20.

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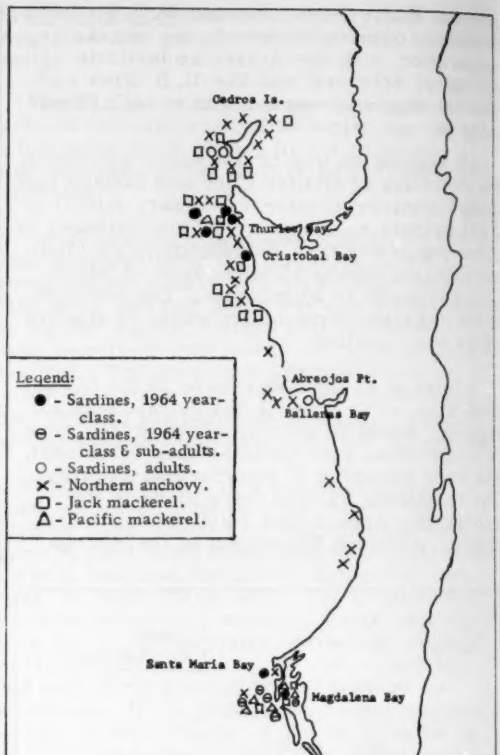
PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 64-A-5-Pelagic Fish (July 28-August 18, 1964): The objectives of this cruise by the California Department of Fish and Game research vessel Alaska in the coastal waters of southern Baja California, Mexico, from Magdalena Bay to Cedros Island were to: (1) survey the pelagic species to determine population densities and to ascertain age and size compositions; (2) assess sardine spawning success for the current year (1964); and (3) collect live anchovies and groupers for blood genetic studies by the U.S. Bureau of Commercial Fisheries Biological Laboratory, La Jolla, Calif.

A large midwater trawl and a blanket net were used as sampling devices. Both types of gear were fished over the same general areas; the trawl on 36 stations and the blanket net on 24. All work was conducted at night, with a bright electric light used to attract fish for capture with the blanket net.

NORTHERN ANCHOVY (Engraulis mordax): Northern anchovies were the dominant species throughout the survey area. They were taken in 24 midwater trawls in numbers ranging from several fish up to 26,000. Visual scouting between stations accounted for 68 schools and 25.5 miles of surface scatter in the 237 miles scouted. (Surface scatter consisted of fish spread sparsely through the top 3 to 4 feet of water, and which were in sight continuously for distances up to several miles.)

Blanket-net stations were ineffective in sampling anchovies due to the negative phototactic reaction of that species to the attracting light. They appeared under the light on 4 stations but remained so deep that only one small sample was obtained.



Alaska Cruise 64-A-5-Pelagic Fish (July 28-August 18, 1964).

Magdalena and Santa Maria Bays contained large amounts of juvenile anchovies 60 to 80 millimeters (2.4 to 3.1 inches) long. They were massed in thick continuous schools along much of the shoreline. Concentrations of adults were present off Abreojos Point and smaller subadults were taken in Cristobal Bay and at Cedros Island. Except for the large amounts of juveniles in the southern part of the area surveyed, anchovy abundance appeared to be at about the same level as the previous year.

PACIFIC SARDINE (Sardinops caeruleus): Pacific sardines were taken at 8 blanket-net stations and in 6 midwater trawl tows. Magdalena and Santa Maria Bays yielded the most fish, accounting for 5 blanket-net and 2 trawl catches. Other catches were made in Bol-

lenas Bay, Cristobal Bay, Thurloe Bay, and at Cedros Island. Juvenile fish-of-the-year predominated, with adults occurring in only three catches. The juvenile sardines were found in pure schools, a change from the usual mixture of a few young sardines in a large school of anchovies. No schools were sighted during night scouting. The 1964 year-class appears to be stronger than those of the preceding 2 years.

PACIFIC AND JACK MACKEREL (Scomber diego and Trachurus symmetricus): Pacific mackerel were taken in quantity only in Magdalena and Santa Maria Bays, where both juveniles and adults were found. The remaining catches consisted of a few individuals of subadult size. The blanket net made 5 catches and the trawl 1. Last year's (1963) survey found Pacific mackerel distributed over a much larger area and in greater quantities.

Jack mackerel were taken mainly in the northern part of the survey area. The trawl accounted for 14 catches and the blanket net 5. The catches consisted wholly of juveniles and subadults, with a preponderance of fish-of-the-year. Those young fish were scattered throughout the upper 3 feet of water and were very vulnerable to the trawl. No schools of either mackerel species were sighted while scouting.

INVERTEBRATES: Squid and pelagic red crab (Pleuroncodes planipes) were frequently taken in the trawl. Several catches of red crab exceeded one ton.

During the cruise, live broomtail grouper (Myctoperca xenarcha) and spotted cabrilla (Epinephelus analogus) were collected for blood serology studies by the U. S. Bureau of Commercial Fisheries Biological Laboratory, La Jolla.

Weather and sea conditions during the cruise were good and permitted completion of all planned work. Sea surface temperatures were considerably colder than normal for the time of year, especially north of Abreojos Point. Temperatures in that area ranged from 59° F. (15.0° C.) to 68° F. (20.0° C.) and averaged about 7° F. colder than during the previous year.

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Airplane Spotting Flight 64-12-Pelagic Fish (August 10-12, 1964): To determine the inshore distribution and abundance of pelagic fish schools, the area from Bodega Bay to Port Hueneme, and Point Vicente to Oceanside, Calif., was surveyed from the air by the California Department of Fish and Game aircraft Cessna "182" N9042T.

On August 10, the area from Jalama Park to Port Hueneme and Point Vicente to Oceanside was scouted. Heavy smoke and haze limited air visibility in the areas flown and precluded surveying much of the southern California coastal area. From Ventura south, "red tide" restricted water visibility. North of Ventura, a total of 56 northern anchovy (Engraulis mordax) schools was noted very near the surf line. At San Onofre, a small school of Pacific bonito (Sarda chiliensis) was sighted on the surface feeding upon smaller unidentified organisms.

On August 12, the area from Bodega Bay to Mussel Point was scouted. Both air and water visibility were good except for a few patches of fog in the Morro Bay-Pismo Beach area.

In Monterey Bay, large concentrations of anchovies were seen near Santa Cruz and Monterey. The fish at Santa Cruz occurred in large unbroken groups; one school being an estimated 4 miles long and $\frac{1}{4}$ mile wide. Many of the schools were in the surf. Anchovy schools were also spotted in Drakes Bay, the San Francisco area, Cayucos-Morro Bay, and the Avila-Pismo Beach areas.

More fish were seen on this flight than on any other flight the past $1\frac{1}{2}$ years.

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Airplane Spotting Flight 64-13-Pelagic Fish (September 1-3, 1964): The area from Point Arena, Mendocino County, to the United States-Mexican Border was surveyed by the aircraft Cessna "182" N9042T. Weather conditions on this flight were ideal for aerial scouting. Air visibility extended up to 50 miles at times and water clarities were generally good. Red tide and other phytoplankton blooms were found in most areas scouted but only in small, local concentrations.

On September 1, the area from Jalama Park to the United States-Mexican Border was scouted. Between Laguna Beach and the Mexican Border, 72 schools of large Pacific bonito (Sarda chiliensis) and 1 school of Cali-

fornia barracuda (Sphyraena argentea) were counted. Northern anchovies (Engraulis mordax) were quite abundant from Dana Point south where 46 schools were tallied.

On the following day, the area from Point Arena to Point Sur was scouted. An extensive school group of anchovies (98 schools) was sighted near the surf between Bolinas Bay and San Francisco; the schools were small and indistinct. The water was a light greenish-brown and turbid. Another anchovy school group (29 schools) was found along the beaches just south of San Francisco.

On the last day of the survey, the area from Santa Cruz Point to Point Vicente was scouted. In Monterey Bay, 18 breezing schools of unidentified fish were counted, all under predation by birds. Very possibly the schools were "pinhead" anchovies. During August there were many large schools of anchovies in that area. Red tide was extensive in the northern part of the bay.

Other school groups of anchovies were found in the Cayucos (23 schools), Avila (11 schools), and Port Hueneme (25 schools) areas. Red tide also was encountered in those same areas.

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Airplane Spotting Flight 64-14-Pelagic Fish (September 15-17, 1964): The area from Punta Banda to Cabo San Lucas, Baja California, Mexico, was surveyed by the Beechcraft N5614D. This was the third of four experimental quarterly flights scheduled for 1964 along the Baja California coastline.

On September 15, the area from Laguna Scammon to Punta del Marquis was scouted. Air and water visibility was very good throughout the area scouted. Large school groups of northern anchovies (Engraulis mordax) were observed from Bahia de San Cristobal south to Bahia de la Magdalena, the majority swimming near the surf line. The schools were rather small, compact clusters. Fish schools also abounded in Bahia de la Magdalena proper. Most were anchovies, but 12 Pacific sardine (Sardinops caeruleus) schools were noted.

On September 16, the area from Cabo San Lucas to Bahia de la Magdalena was scouted. A large school group of sardines (56 individual schools) were breezing south of the Bahia and 10 miles offshore. Many anchovy and a few sardine schools were again seen in the Bahia proper. Air and water visibility was excellent that day.

The area from Laguna Scammon to Punta Banda was scouted on the last day of the survey. Water visibility ranged from good to poor. Air visibility was reduced by low broken clouds over part of Bahia de Sebastian Vizcaino. Scouting north of Punta Banda was terminated due to a complete cloud cover. Red water was encountered at Punta Canoas, Cabo San Quintin, Cabo Colnett and Punta Banda.

Anchovy schools were seen in Bahia de Sebastian Vizcaino, near Punta Canoas, Punta Baja and Cabo San Quintin. Five sardine schools were sighted, 3 near Punta Santo Domingo and 2 southwest of Punta Canoas. Most schools of both species were again seen near the surf line.

This flight was by far the most productive, in numbers of schools seen, of the three Beachcraft N5614D flights flown this year.

Note: See Commercial Fisheries Review, November 1964 p. 24; October 1964 p. 16.

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HATCHERY FISH LOSSES ATTRIBUTED TO FOOD PROBLEM:

Something in a fish food formula apparently caused the excessive fish losses experienced at California State hatcheries during the summer of 1964. From mid-July through late September 1964, approximately 2,128,000 small fish died in California State fish-rearing installations. That was about 9 percent of the 23 million fish in the hatcheries when the problem arose.

As soon as the excessive death rate was noted, scientists began searching for the cause. The possibility of a disease outbreak was ruled out first. Then other avenues were investigated. When a change to different kinds of fish food began to bring the situation under control, fish culturists were led to believe that the original food might have been responsible.

Rainbow trout were hit hardest, with 1.7 million small fish lost from the 18.2 million rainbows on hand when the problem started. About 100,000 trout of other species also were lost. Although the loss was much heavier than

is normal for hatchery operations, the California Department of Fish and Game said it would still be able to meet 1965 trout requirements. Additional trout eggs can be taken, hatched, and reared to replace the lost fish.

King salmon, silver salmon, and steelhead trout were less severely affected. Among that group, losses because of the food problem were as follows: of 696,000 king salmon on hand, 130,000 were lost; of 1,880,000 silver salmon on hand, 13,000 were lost; and of 2,198,000 steelhead on hand, 185,000 were lost.

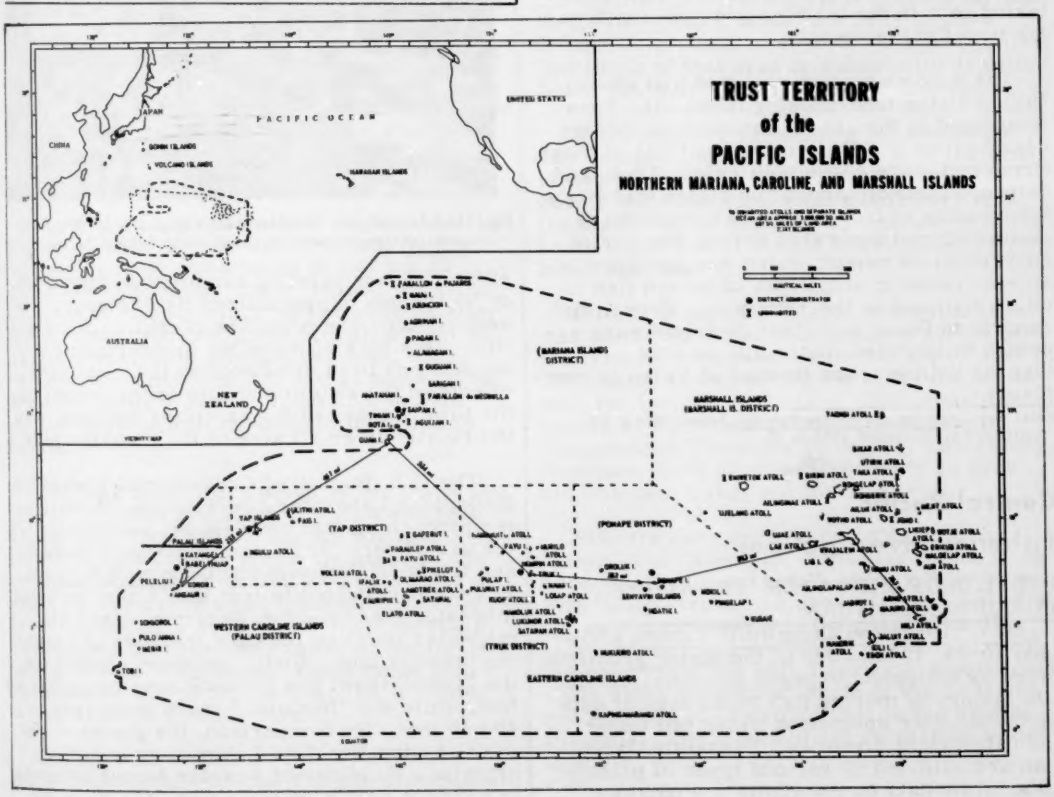
The king salmon involved were fish being raised to yearling size in an experimental program. Plants of king salmon fingerlings (totaling about 11.8 million fish) made before the food problem arose accounted for the bulk of king salmon production in California State hatcheries in 1964. Steelhead trout and silver salmon are usually planted as yearlings, although 1,512,000 steelhead were also planted as small fingerlings earlier this year.

California hatchery officials stated that although the problem seems to be under control, some further losses are anticipated due to the after effects of the food problem, particularly among king salmon. (California Department of Fish and Game, October 3, 1964.)

Caroline Islands

COMMERCIAL FISHERIES PROJECT AT PALAU BEING DEVELOPED:

A major breakthrough in commercial fisheries development in the Caroline Islands Group of the United States Trust Territory of the Pacific occurred in 1963. At that time, an agreement was signed between a California tuna-packing firm and the Trust Territory



Government for the establishment of a commercial fishery enterprise at Palau. The contract called for the development of extensive fishing operations in Palau, as well as establishing a commercial tuna-freezing plant and for the training of Micronesians ashore and at sea. Shore installations and other facilities were to be built by the United States firm with the cooperation of the Trust Territory Administation.

In its 16th Annual Report to the United Nations, the Trust Territory Administration said the opening of Palau to commercial fishing marks the first major step toward large-scale development of the most important natural resource of the Territory, and is expected in time to lead to similar enterprises in other districts. The administration reported that the Pilot Fisheries Project at Palau was in operation and that a cold-storage freezer plant had been completed. In 1964 the program to train Micronesians in live-bait tuna fishing was under way with some 25 trainees taking part in the training program on Hawaiian tuna fishing vessels.

The Administration reported that other United States tuna-packing firms also were interested in the area's commercial fishery possibilities and that representatives of those firms had made surveys in Palau, Truk, and Saipan. The Administration stated that while the quantity of frozen reef fish exported to Guam dropped somewhat during the period covered in its report, there was an appreciable increase in shipments of frozen fish to other districts in the Territory. Frozen fish exports to Guam and other districts were expected to increase materially in 1964 now that the cold-storage freezer at Palau is completed.

Note: See Commercial Fisheries Review, August 1964 p. 16; April 1964 p. 32; August 1963 p. 85.

Central Pacific Fisheries Investigations

RESULTS OF MIDWATER TRAWLING FOR JUVENILE TUNA:

M/V "Townsend Cromwell" Cruise 7 (August 10-24, 1964): One of the major problems faced by biologists engaged in studies on the life history of marine fish is the lack of data on the smaller specimens which fall under the category of juveniles. Presently, larval fish are sampled by various types of plankton nets, while data on the adults are obtained either through existing commercial fisheries or by the use of specialized fishing gear. In neither case are juveniles caught in any quantity. This lack of juveniles in the plankton catches has been attributed to the combined effects of the swiming ability of the juveniles, the towing speed of the sampling devices, and the relatively small size of the plankton nets.

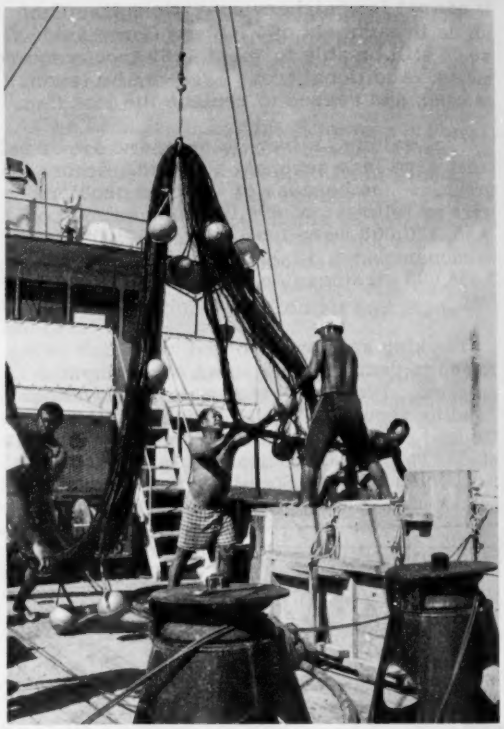


Fig. 1 - Recovering the Nanaimo trawl aboard a U. S. Bureau of Commercial Fisheries research vessel in the Central Pacific.

The U. S. Bureau of Commercial Fisheries Biological Laboratory in Honolulu, Hawaii, is approaching that problem by considering the use of very large nets. This past August, sea trials (M/V Townsend Cromwell Cruise 7) were carried out to test the "Cobb" pelagic midwater trawl and the "Nanaimo" Mark IV midwater trawl as possible methods of catching juvenile tuna. Under optimum conditions, the "Cobb" trawl has a mouth opening of 80 x 80 feet, while the "Nanaimo" trawl measures 40 x 40 feet. By comparison, the plankton net in use by the Honolulu Laboratory is a ring net with a diameter of 1 meter (about 3.3 feet). In order to retain juvenile tuna less than 30

Fig. 2 - Emptying the Nanaimo trawl.

millimeters (1.2 inches) in length, the "Cobb" and "Nanaimo" trawls used in the trials were modified by adding small-mesh cod-end liners ($\frac{1}{2}$ inch stretch-mesh nylon to the "Cobb" trawl and $\frac{1}{4}$ inch square-mesh nylon to the "Nanaimo" trawl).

A preliminary analysis of the trawl catches showed that 2 juvenile skipjack tuna (Katsuwonus pelamis) were taken in 1 of the 11 hauls made with the "Cobb" trawl. With the "Nanaimo" trawl, which had slightly smaller mesh sizes than the "Cobb" trawl, a total of 12 hauls yielded 5 juvenile skipjack. The catches were made in 2 of the 12 hauls. The juveniles ranged in size from 15.0 to 25.0 millimeters (0.6 to 1.0 inches) in standard length.

The test hauls were made in the lee of the islands of Oahu and Hawaii, where skipjack are usually plentiful during the summer months. Hauls were generally made in the morning between 0700 and 1000 hours and at night between 1900 and 2200 hours. All the juvenile skipjack were taken in the morning hauls when the trawl was towed at depths between 40 and 60 fathoms. Hauls made near the surface and at depths over 70 fathoms failed to catch juvenile tunas.

During that cruise a recently acquired trawl depth indicator (the Furuno Net-Sonde) was tried. The instrument, which is activated at a depth of 25 fathoms by a pressure switch in the transducer, was operated successfully.

On several occasions, traces of what appeared to be sizable schools of fish were picked up by the SIMRAD depth recorder. No attempt was made to fish the schools because of the time limitation. Nevertheless, several important questions arise from those traces: (1) whether the traces did indeed represent schools of commercial fish, and if so, whether they were composed of bottom fish not presently being exploited commercially, (2) whether the bottom topography surrounding the islands are suitable for trawling, and (3) whether the trawlable area is large enough and fish plentiful enough to sustain trawling on a commercial scale.

Based on recent reports on trends in trawling methods, it is quite feasible to use existing types of gear to depths of 100-400 fathoms for commercial fishing. It is noteworthy that in the Hawaiian Islands, the 100- to 400-fathom area contains over 5,000 square miles; how much of that area is suitable for trawling is not yet known, but it could be considerable.

A preliminary assessment of abundance and composition of fish available to trawling is contemplated for the future by the Bureau's Honolulu Biological Laboratory and the discovery of new fishery resources would be an important economic development in island fisheries.

On this cruise the "Cobb" midwater trawl was tested off Waianae and also a series of trawl hauls were made with the "Cobb" and "Nanaimo" midwater trawls in the lee of Hawaii for biological studies. The vessel (operated by scientists of the U.S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii) experimented in an area off Waianae, Oahu, and Kona, Hawaii.

Side trawling operations using both the "Cobb" and "Nanaimo" midwater trawls were accomplished successfully during this cruise. The "Cobb" trawl was used successfully without any modification in the gear. The "Nanaimo" trawl was modified considerably with the removal of the stabilizer fins, addition of chain along the entire length of the footrope and addition of 10 extra floats to the original 14 floats. The modified net performed better than the "Cobb" trawl due to smaller mesh size.

Out of a total of 28 hauls, 5 were made with the "Cobb" trawl in the test area off Waianae where the 2 juvenile skipjack tuna were taken in a morning haul. Eleven hauls with the same trawl off the lee of Hawaii yielded no juvenile tuna. The catches were generally less than $\frac{3}{4}$ gallon of material. Twelve hauls with the modified "Nanaimo" trawl resulted in 2 hauls catching 1 and 3 juvenile skipjack, respectively. The volume of catches generally exceeded those made with the "Cobb" trawl. All the juvenile tuna were taken in the morning hauls between the hours of 0700-0930. Both day and night surface hauls caught very few or no juvenile fish.

A trial surface tow with the 2-meter plankton net showed that this could be an excellent sampling device. The meter attached to the ring operated satisfactorily but the loose corner connections of the metal frame caused the net to collapse. This can be easily corrected by constructing a frame with rigid corners.

From the results of the trawling operations, it was concluded that it is now possible to design a net that will serve the best purpose in attaining adequate catches and in reducing the manpower required for that operation.

No tuna schools were sighted in the lee of Hawaii during the $1\frac{1}{2}$ weeks of trawling. This may possibly have had some bearing on the poor catches of juvenile tuna made with the trawls.

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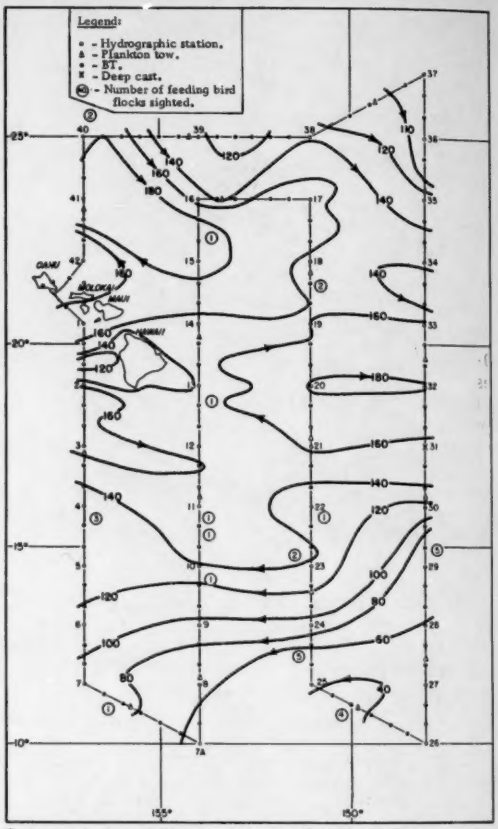
TRADE WIND ZONE
OCEANOGRAPHIC STUDIES CONTINUED:

M/V "Townsend Cromwell" Cruise 8 (September 1-20, 1964): This was the seventh in a series of oceanographic cruises to determine rates of change in the distribution of properties in the trade wind zone of the central North Pacific. The research vessel Townsend Cromwell of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, operated in the central North Pacific bounded by latitudes 10° N., 27° N. and longitudes 148° W., 158° W. during this cruise, which was completed September 20, 1964.

A total of 43 oceanographic stations was occupied along the cruise track. At each of the stations occupied, temperatures and samples for salinity analysis were obtained at 20 depths to 1,500 meters (4,921 feet). A deep cast to 5,000 meters (16,404 feet) was taken at station 31.



Cruise track chart of Townsend Cromwell Cruise 8 (September 1-20, 1964), showing depth contours of the 20° C. isotherm in meters.

The September surface circulation pattern did not differ markedly from the pattern seen during the month of July (Townsend Cromwell Cruise 6). During both those months, a broad region of variable flow between 15° and 23° N. latitude separated the relatively faster currents moving eastward in the northern portion and westward in the southern portion of the study area. The westerly flow, the North Equatorial Current, appeared to have increased in intensity during this cruise, as suggested by the sharper gradients of the isotherm depths. Surface temperatures in the study area ranged from 24° C. to 27° C. (75.2° F. to 80.6° F.), as before. An increase in the extent of the weak, secondary surface

thermocline was also noted throughout the region covered.

A total of 28 feeding bird flocks were sighted on this cruise as compared with 49 sightings during the July Townsend Cromwell cruise. Ten plastic-enclosed drift cards were released at 30-mile intervals along the entire cruise track during this cruise.

Note: See Commercial Fisheries Review, November 1964 p. 27

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EARTH'S GRAVITATION MEASURED:

M/V "Charles H. Gilbert" Cruise 73 (May 29-June 4, 1964): This cruise by the research vessel Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, to obtain measurements of the earth's gravity, was in collaboration with the Institute of Geophysics, University of Hawaii.

The Charles H. Gilbert made rendezvous with the University's research vessel Neptune I, and the two vessels thereafter proceeded independently. Sea conditions were unusually calm during the entire cruise, permitting some 1,000 miles of gravity observations out of about 1,170 miles total cruise. This was considered a successful cruise since there had been some question as to whether or not a sea gravimeter could operate on a small vessel.

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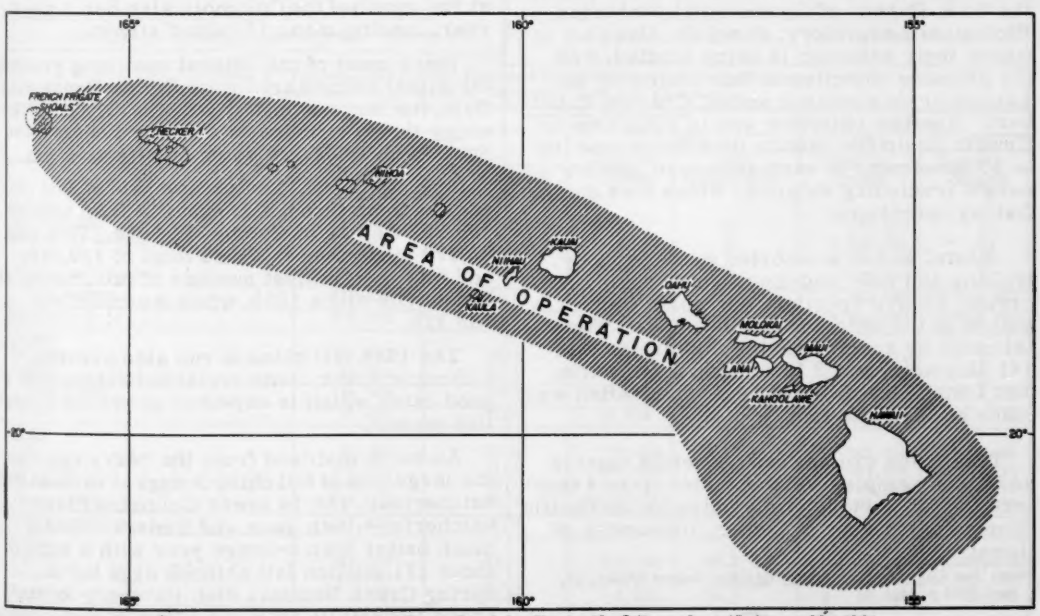
TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 74 (June 16-August 23, 1964): Tuna biological studies and oceanographic observations were the objectives of this cruise by the research vessel Charles H. Gilbert. The area in which the research vessel operated was bounded by latitudes 18°30' N. to 23°50' N. and longitudes 154°30' W. to 166°20' W.

Successful fishing areas for skipjack tuna during this cruise included the waters from Kauai to Kaula Island, Penguin Banks, the Kona coast and Hilo on the island of Hawaii, and the banks region near the island of Nihoa. A total of 1,681 skipjack blood samples was collected from 19 schools and a standard watch for bird flocks was maintained.

During the cruise, a total of 72 bird flocks was sighted, 53 were associated with skipjack schools, 8 with mahi-mahi schools, and 11 were unidentified.



Shows area of operations during Cruise 74 of the Charles H. Gilbert, June 15-August 23, 1964.

Bathythermograph casts were taken at 3-hour intervals when practicable throughout the cruise. A water sample for salinity measurements was taken with each cast. Additional surface salinities and temperatures were taken each time a school was fished.

Drift cards were released every 3 hours during the regular BT schedule, and a standard weather watch was maintained.

A total of 155 live skipjack, 17 yellowfin, and 4 Euthynnus yaito was obtained for the Laboratory's Behavior Program studies.

Landings were made on Nihoa, Necker and various portions of French Frigate Shoals to search for drift cards but none was found.

A demonstration cruise was given by the vessel during the Hawaiian International Billfish Tournament held at Kona, Hawaii. A total of 189 skipjack was caught and 100 blood samples were taken on that cruise.

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TUNA BEHAVIOR STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 75 (September 14-18, 1964): To collect and return live scombrids to the Kewalo Basin tanks of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, where their behavior is being studied, was the primary objective of this cruise by the Laboratory's research vessel Charles H. Gilbert. Another objective was to return to Kewalo Basin for density determinations up to 10 specimens of each scombrid species caught (excluding skipjack) which died during fishing operations.

A total of 146 scombrids was caught by trolling and pole-and-line fishing during the cruise, 66 live specimens of which were placed in the behavior facility tanks. The total catch by species during this cruise was 141 skipjack tuna, 3 little tuna, 2 yellowfin, and 1 mahi-mahi. Density determination was made of one little tuna.

During the cruise, red and white muscle and blood samples were obtained from 4 skipjack for ion-metabolism studies by the Pacific Biomedical Research Center, University of Hawaii.

Note: See Commercial Fisheries Review, August 1964 p. 16; June 1964 p. 14.

Columbia River

SALMON RETURNS ENCOURAGING:

Silver: By early October 1964, more than 51,062 silver salmon had passed through the counting ladders at Bonneville Dam on the Columbia River, setting a new record for the period since 1938 when salmon counting began on the Columbia. Silver salmon usually run until mid-October so the final 1964 returns should be even greater. The previous record year was 1941 when 17,911 silvers passed Bonneville Dam.

The tremendous increase in silver salmon returns is apparently due to the improved fish hatchery program in the Columbia River and its tributaries, according to officials of the U. S. Fish and Wildlife Service. The Columbia River hatcheries are producing larger and more vigorous fingerling silver salmon which are reared to yearling size for their migration to the ocean.

The improved quality of the silvers is indicated by the 1964 commercial landings, in which the average silver salmon weighed about 10 pounds--2 pounds more than normal. Total silver salmon landings in 1964 by Columbia River commercial fishermen are expected to exceed 1 million pounds. Sport fishermen at the mouth of the Columbia also had a good year, landing many 15-pound silvers.

Since most of the natural spawning grounds for silver salmon are located below Bonneville Dam, the large return of silvers to hatcheries above the dam indicates that the Federal and State hatcheries are doing an effective job.

Fall Chinook: The escapement of fall chinook salmon through Bonneville Dam totaled 169,292 fish as of October 5, 1964. That was 30,222 more than the 1963 total of 139,070, and was the greatest number of fall chinook at Bonneville since 1959, when the count was 189,115.

The 1964 fall chinook run also provided Columbia River commercial fishermen with a good catch which is expected to exceed 3 million pounds.

An extra dividend from the heavy run was the large take of fall chinook eggs at various fish hatcheries. The 14 lower Columbia River hatcheries--both State and Federal--had a much better than average year with a total of about 111 million fall chinook eggs taken. Spring Creek National Fish Hatchery located above Bonneville Dam near Underwood, Wash.,

led all the hatcheries with 45 million eggs collected from the spawning run to the hatchery and 3 million from the run to the Big White Salmon River. Bonneville Hatchery of the Oregon Fish Commission took 15 million eggs. After hatching, the fish from those eggs will be raised at the hatcheries and released into the main river or tributary streams to start their migration to the ocean.

Spring Chinook: Good numbers of spawning spring chinook salmon--some 21 percent more than the average counted during the past 15 years--were tallied during a late survey of 5 key salmon-producing streams in eastern Oregon. The purpose of the spawning ground survey (made annually by the Oregon Fish Commission) is to determine the trend of spawning escapement to upriver tributaries of the Columbia River. During the surveys, fisheries men walk sample sections of certain streams on one occasion each year during the peak of spawning activities, counting all adult salmon encountered, both alive and dead. The total number of fish thus counted is taken as the index number for the year. That number can be compared with the numbers obtained in other years for an indication of the trend of escapement to the spawning grounds--whether up, down, or relatively stable.

The 1964 count of 1,072 spring chinook spawners on slightly less than 40 miles of index stream is among the highest since the annual surveys began in 1948. (The count represents only a portion of the total number of spawners present in the five streams, and is not intended to be a complete count of the fish present in them.)

Index spawning areas covered in the annual survey include portions of the Minam, Lostine, and Imnaha Rivers and Catherine and Lookingglass Creeks. A prespawning loss of adults resulting from a flash flood on Catherine Creek during late July reduced this year's count which otherwise would have been even more favorable.

The annual survey is only a sampling program. It does not cover many good eastern Oregon spawning streams and it does not include Idaho and eastern Washington where other good Columbia watershed chinook spawning tributaries are located.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-SEPTEMBER 1964:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, more fresh and frozen fishery products were purchased in September 1964 than in the previous month. The increase--40.3

Table 1 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Subsistence Supply Centers, September 1964 with Comparisons

Product	September				Jan.-Sept.	
	1964		1963		1964	1963
	Quantity Pounds	Cost Cents/Pound	Quantity Pounds	Cost Cents/Pound	Quantity Pounds	Quantity Pounds
Shrimp:						
raw headless	115,100	85.2	1/	1/	970,550	1/
Peeled and deveined	197,200	99.8	1/	1/	1,060,622	1/
breaded	360,850	75.1	1/	1/	3,175,850	1/
molded and breaded	-	-	1/	1/	349,770	1/
Total shrimp	673,150	84.1	553,250	76.8	5,556,792	5,018,664
Scallops	208,060	59.6	175,457	55.5	2,311,150	2,062,107
Oysters:						
Eastern	71,732	96.1	1/	1/	629,314	1/
Pacific	43,136	64.4	1/	1/	235,072	1/
Total oysters	114,868	84.2	125,945	94.7	864,386	883,723
Clams	17,552	31.6	20,206	32.2	215,903	201,370
Fillets:						
Cod	80,300	28.6	32,836	29.3	382,466	488,685
Flounder	235,636	27.6	205,673	29.8	2,443,502	2,389,927
Haddock	235,000	30.7	143,107	37.3	1,583,854	1,666,576
Ocean perch	421,000	26.8	348,026	31.2	2,791,420	2,932,651
Haddock portions	181,650	46.8	-	-	337,464	-
Steaks:						
Halibut	143,050	43.5	171,052	38.5	1,016,127	1,108,073
Salmon	28,750	63.8	15,063	54.8	173,275	143,650
Swordfish	1,055	56.6	1,318	54.6	10,635	24,068

1/Breakdown not available.

percent in quantity and 28.2 percent in value--was due to larger purchases of scallops, oysters, and finfish products. Total shrimp purchases were about the same in both months.

Table 2 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, September 1964 with Comparisons

QUANTITY				VALUE			
Sept.		Jan.-Sept.		Sept.		Jan.-Sept.	
1964	1963	1964	1963	1964	1963	1964	1963
(1,000 Lbs.)				($1,000)			
2,665	1,853	20,078	17,673	1,464	992	10,819	9,942

Compared with the same month in the previous year, purchases in September 1964 were up 43.8 percent in quantity and 47.6 percent in value. This September there were larger purchases of shrimp, scallops, and most fish fillet items, particularly haddock fillets and portions.

Total purchases in the first 9 months of 1964 were up 13.6 percent in quantity and 8.8 percent in value. In January-September 1964 there were larger purchases of shrimp and scallops, but noticeably lower purchases of cod fillets, ocean perch fillets, and halibut steaks.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, September 1964 with Comparisons

Product	QUANTITY				VALUE			
	Sept.		Jan.-Sept.		Sept.		Jan.-Sept.	
	1964	1963	1964	1963	1964	1963	1964	1963
	(1,000 Lbs.)				($1,000)			
Tuna	1,066	647	4,282	2,711	452	290	1,907	1,297
Salmon	2	12	681	30	1	8	417	20
Sardine	18	43	260	375	10	15	153	150

Canned: In the first 9 months of 1964, total purchases of the 3 principal canned fishery products (tuna, salmon, and sardines) were up 67.6 percent in quantity and 68.8 percent in value due mainly to larger purchases of tuna. Canned salmon purchases were also up, but there was a modest decline in canned sardine purchases in January-September 1964 due principally to the light 1964 season pack.

Freeze-Dried: Fishery purchases for the Armed Forces in September 1964 included 1,960 pounds of freeze-dried shrimp (cooked) with an average value of $10.49 per pound, and 540 pounds of freeze-dried shrimp (raw) with an average value of $18.48 per pound.

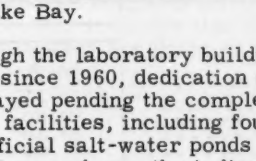
Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, Nov. 1964 p. 28

Fish Hatcheries

STUDIES ON RE-USE OF HATCHERY WATER CONTINUED:

Experiments with re-use of hatchery water for salmonids (involving oyster-shell filtration and bacterial recondition) conducted by the U. S. Bureau of Sport Fisheries and Wildlife have been expanded from the highly successful circular tank model to pilot-scale raceways. An aeration tower has been constructed at the Salmon-Cultural Laboratory, Longview, Wash., the filter beds and reconditioning units were made ready, and 80 pounds of fingerling chinook salmon were introduced into each of two raceways. The oyster shell not only filters the water but also keeps the pH up, and the nitrogen-metabolizing bacteria keep ammonia concentration down. Growth of fish in the earlier tests of re-used water was exceptionally good and mortalities exceptionally low. The prospects seemed excellent for application in areas where water supplies are low.



Fisheries Laboratory

BIOLOGICAL LABORATORY AT OXFORD, MD., DEDICATED BY U.S. BUREAU OF COMMERCIAL FISHERIES

The U. S. Bureau of Commercial Fisheries held dedication ceremonies on October 17, 1964, for its Biological Laboratory at Oxford, Md. It is the Bureau's first laboratory on Chesapeake Bay.

Although the laboratory building has been occupied since 1960, dedication ceremonies were delayed pending the completion of other research facilities, including four quarter-acre artificial salt-water ponds where large-scale culture and growth studies will be carried out.

Donald L. McKernan, Director of the Bureau of Commercial Fisheries, said the Oxford Laboratory has already made valuable contributions in several scientific fields, including studies of shellfish mortality and shellfish culture. Research at the laboratory is conducted in cooperation with State authorities in New Jersey, Delaware, Maryland, and Virginia.

The Oxford Laboratory is located on a major estuary which has a salinity range from fresh to oceanic water. Chesapeake Bay is

an excellent breeding, nursery, and feeding ground for many sport and commercially important fish. In the adjacent ocean and in seaside bays are oysters, surf clams, soft and hard clams, crabs, and many fish species of recreational and commercial importance.

The Oxford Laboratory also maintains a Field Station at Chincoteague Bay, Va., where studies requiring oceanic salinity are conducted.

The largest operation at the Oxford Laboratory is the shellfish mortality program. In recent years massive oyster mortalities due to disease have virtually wiped out the oyster industry in Delaware Bay, and seriously damaged the industry in Virginia. The cause of the mortalities is as yet unknown, although there is some epidemiological evidence that indicates an organism called MSX (multinucleate sphere unknown) may be the infective agent responsible.

The laboratory staff numbers 24 (12 professional scientists and an equal number of supporting aides and technicians), with additional scientists scheduled to join the research group.

The Bureau of Commercial Fisheries operates 20 biological research laboratories located on the Atlantic, Gulf, and Pacific coasts, and in Hawaii and Alaska. Each has specific missions concentrating on important commercial species in its area.

Fishery Research

FEDERAL AID FISHERY RESEARCH AND SPECIAL STUDIES:

Many new Federal Aid fishery research projects were approved by the U.S. Bureau of Sport Fisheries and Wildlife this past June. Virginia and Georgia will participate in a cooperative fish disease and parasite study. Oregon will study Kokanee salmon and coastal cutthroat trout ecology. Wyoming will determine the role of three tributary streams in the natural perpetuation of cutthroat trout in the Snake River.

Tennessee will evaluate the effect of Cordell Hull Dam construction on the 7-mile-long fishery in the tail waters of the Dale Hollow Dam. Kentucky Reservoir fishing survey will be a combined study conducted by the Tennessee Valley Authority and the Kentucky and Tennessee conservation departments. Colorado will make preimpoundment investigations of the Curecanti Unit, Upper Colorado River Storage Project.

Louisiana plans an ecological survey of factors affecting fish production in a natural lake and in a river. California will investigate the effects of artificial destratification in a reservoir and measure physical and chemical changes in the water. California also will conduct environmental and behavioral studies on coastal sport fishes living in the rocky subtidal area.

Montana will undertake fisheries surveys by helicopter on 10 mountain lakes in the Bitter-root River Drainage that are inaccessible by road. New general statewide fisheries surveys were started in Oklahoma, Montana, Kansas, North Carolina, and Colorado.

Also, contracts for special studies have been signed with universities where cooperative fishery units are located: University of Maine--striped bass spawning in Maine coastal streams; Cornell University--methods for marking young fish; University of Massachusetts--life history of rock bass, Quabbin Reservoir; Pennsylvania State University--ecology of the white sucker; and North Carolina State University--variation in growth rate in bluegills. The results of those studies will be applicable to State and Federal fishery programs.

Fishing Limits

THIRD INTERNATIONAL LAW OF THE SEA CONFERENCE RECOMMENDED BY AMERICAN BAR ASSOCIATION GROUP:

A resolution concerning the width of the territorial sea and fishing limits was adopted by the House of Delegates of the American Bar Association at its annual meeting in New York City, August 12, 1964. The resolution said that the territorial sea and fishery controls should be considered as unrelated and separate problems. The resolution recommended that the American Bar Association strongly urge that the United States Government:

1. Publicly proclaim its willingness to join with other states in reaching separate agreements for:

(a) Substantial uniformity of breadth of the territorial sea for the purpose of ensuring free and unhampered navigation in, on, and over the maximum expanse of the high seas, and

(b) fishery controls for sound utilization and conservation of the living resources of the sea, including agreement upon reasonable zones for exclusive fishery rights in coastal states.

2. Take the lead in urging the United Nations to convene a Third United Nations Law of the Sea Conference at which, for the first time, the consideration of freedom of navigation, and fishery controls, as unrelated and separate problems would, hopefully, enable states to agree upon solutions to each of these problems.

3. Immediately constitute an expert study group, with political, military, industrial, scientific, and legal representation, to recommend specific solutions to each of the aforesaid problems which will both serve the individual interests of the United States and gain acceptance in the family of nations.

Fur Seals

PRICES FOR ALASKA SKINS AT FALL 1964 AUCTION:

The fall auction in 1964 (October 8-9) of United States Government-owned fur seal skins yielded $2.36 million. The total value was slightly more than that received for the spring 1964 auction, but more skins were sold and the average price per skin was considerably lower than during the spring auction.

The average price per skin received for male fur seal skins (dyed Black, Kitovi, and Matara) was $85.56 and for female skins (dyed Black, Kitovi, and Matara) $64.34. At the spring 1964 auction, the average price paid for male skins was $105.45 and for female skins $71.16.

Lakoda (female sheared) seal skins brought an average price of $59.65 at the fall 1964 auction, or a much higher price than the average of $48.82 at the spring 1964 auction and $40.63 at the fall 1963 auction. This increase is due to the intoduction of a dyed Lakoda product.

Average prices received for processed male fur seal skins by color or type at the fall 1964 auction were: Black, $91.58, Kitovi, $67.41, Matara, $83.81. Average prices for both male and female dyed skins combined at the fall 1964 auction were (average for spring 1964 auction in parentheses): Black, $84.51 ($92.47); Kitovi, $62.49 ($81.66); Matara, $75.89 ($91.58).

Note: See Commercial Fisheries Review, June 1964 p. 15; December 1963 p. 25.

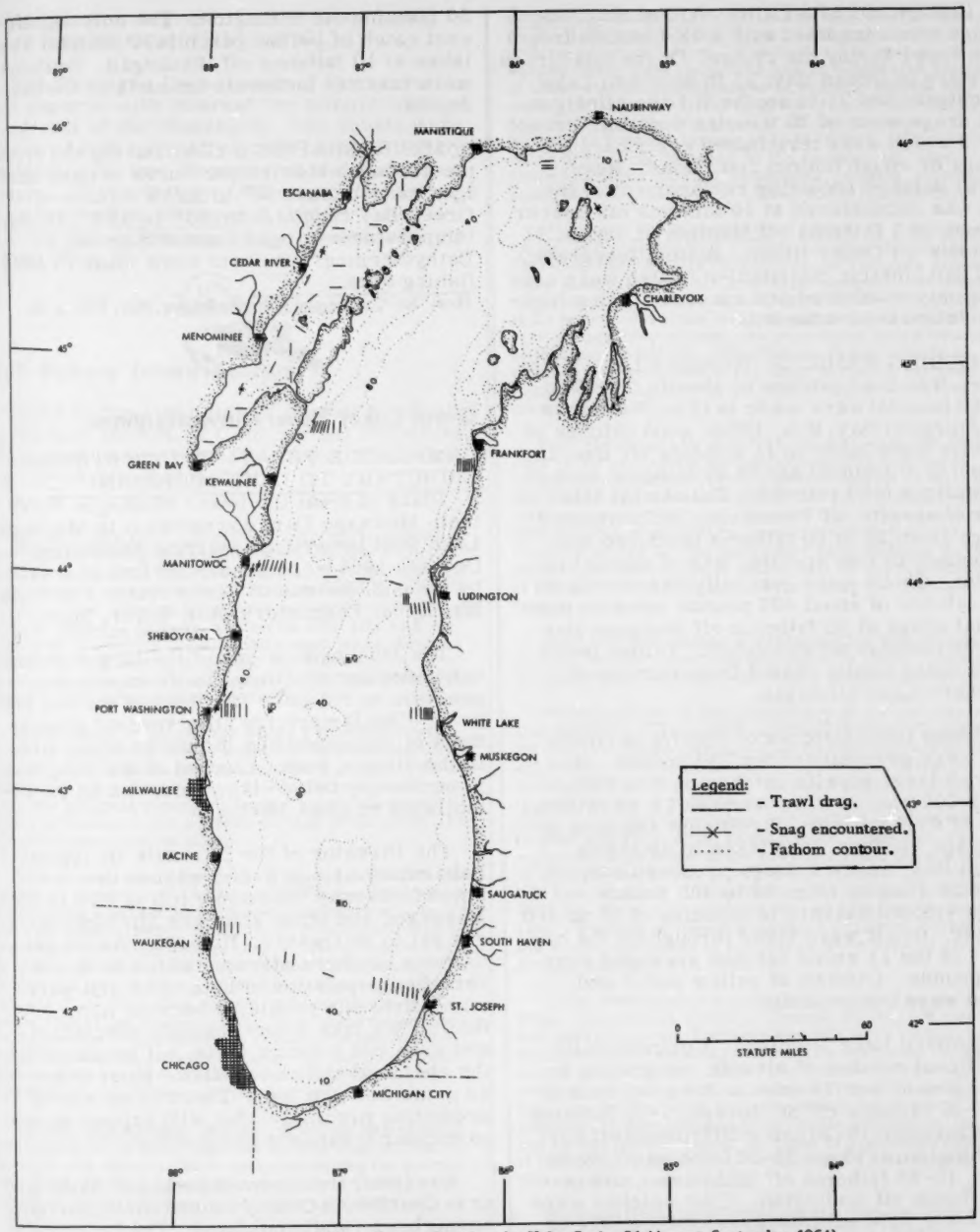
Great Lakes Fisheries Explorations and Gear Development

SEASONAL DISTRIBUTION AND ABUNDANCE STUDIES OF ALEWIFE, CHUB, AND YELLOW PERCH IN LAKE MICHIGAN CONTINUED:

M/V "Kaho" Cruise 21 (August-September 1964): To extend knowledge of the seasonal distribution and abundance of alewife and chub, in Lake Michigan and their availability to bottom trawls was the primary purpose of this 21-day cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing and gear research vessel Kaho. Special efforts were also made during the cruise to locate and determine the availability of yellow perch to bottom trawls in southern Lake Michigan. Other objectives of the cruise were to: (1) collect length-frequency data on chub, alewife, and yellow perch; (2) collect samples of various species of fish for laboratory analysis relating to special studies; and (3) obtain half a ton of chubs for animal nutrition studies at Cornell University. Cruise 21 of the Kaho was divided into several trips during August and September, partly for the benefit of observers, and was completed September 29, 1964.

The cruise marked the virtual completion of the southern Lake Michigan part of the project to study alewife and bloater chub during all phases of the year, in respect to abundance and availability. Those explorations, which required about $2\frac{1}{2}$ years to complete, have (1) verified the existence of a substantial alewife and chub resource which is only partially used and (2) established the fact that otter-trawl nets are practical for catching those species almost continuously throughout the year for animal food and fish meal manufacturers. Future operations in the southern part of Lake Michigan will be concerned with evaluating shallow-water fish stocks and with further development of more economical methods to catch such abundant species as alewife and bloater chubs.

Explorations in Green Bay and northern Lake Michigan during the cruise provided information useful for fishermen catching alewife for reduction into fish meal. Several very good catches of alewife were made in central Green Bay and in Lake Michigan off the Sturgeon Bay ship canal. The initial year-round study of those areas is only about half completed and will be continued during cruises later this year and throughout 1965.



Lake Michigan and Green Bay explorations by Kaho Cruise 21 (August-September 1964).

FISHING OPERATIONS: A total of 122 trawl drags was completed with a 52-foot (headrope) fish trawl during the cruise. Of the total drags, 24 were in Green Bay, 27 in northern Lake Michigan, and 71 in southern Lake Michigan. All drags were of 30 minutes duration, except for 9 which were terminated early because of snags or rough bottom conditions. Heavy trawl damage requiring replacement of the net was encountered at 10 fathoms off Beaver Island, at 5 fathoms off Manitowoc, and at 11 fathoms off Cedar River. Bottom topography and bathymetric distribution of fish were continuously monitored and recorded with a high-resolution echo-sounder.

FISHING RESULTS: Northern Lake Michigan: The best catches of alewife (1,100 to 1,800 pounds) were made in 15 to 25 fathoms off Sturgeon Bay, Wis. Other good catches of alewife were taken in 15 fathoms off Beaver Island (550 pounds) and in 20 fathoms east of Manistique (450 pounds). The almost total lack of alewife off Frankfort, Mich., where 8 drags from 20 to 60 fathoms produced only 15 pounds of that species, was of special interest. Chubs were generally scarce except for catches of about 400 pounds taken in individual drags at 35 fathoms off Sturgeon Bay and 25 fathoms off Frankfort. Yellow perch were again totally absent from catches in northern Lake Michigan.

Green Bay: Catches of alewife in Green Bay were generally under 350 pounds. However, 3 large alewife catches of 700, 800, and 2,000 pounds were taken in 13-18 fathoms east of Cedar River. Significant amounts of carp and suckers were taken in southern Green Bay, where 4 drags produced carp in amounts ranging from 80 to 600 pounds and 4 drags yielded suckers in amounts of 55 to 400 pounds. Smelt were taken throughout the bay, and 7 of the 14 smelt catches averaged over 100 pounds. Catches of yellow perch and chubs were insignificant.

Southern Lake Michigan: Commercially significant catches of alewife, ranging up to 1,100 pounds per 30-minute drag, were taken in 10-25 fathoms off St. Joseph, 5-15 fathoms off Waukegan, 10-20 and at 30 fathoms off Port Washington, at 15 and 25-30 fathoms off White Lake, 10-25 fathoms off Manitowoc, and at 15 fathoms off Ludington. Chub catches were relatively light with the best catches (300 to 390 pounds) being taken at 35 and 40 fathoms off St. Joseph, 25 and 45 fathoms off Waukegan, 20 and 25 fathoms off Port Washington, and 50 fathoms off Ludington. The only significant catch of yellow perch (490 pounds) was taken at 10 fathoms off Waukegan. Sculpins were taken in moderate amounts at the deeper depths.

HYDROGRAPHIC DATA: During the cruise, the surface water temperatures of Lake Michigan ranged from 50° to 65° F.; those of Green Bay ranged from 57° to 63.5° F. Air temperatures ranged from 46° to 70° F. Bathythermograph casts were made in each fishing area.

Note: See Commercial Fisheries Review, Nov. 1964 p. 30.

Great Lakes Fishery Investigations

LAMPRICIDE TREATMENT OF STREAMS TRIBUTARY TO LAKE MICHIGAN:

Plans to treat the lower Muskegon River from Mewaygo Dam downstream to Muskegon Lake with lampricide starting some time in October 1964 were announced this past fall by the U.S. Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich.

The Muskegon is one of the larger rivers scheduled for treatment in the continuing program to rid Lake Michigan of the sea lamprey. The lampricide kills several generations of immature sea lampreys which live in the stream beds. Control of the lampreys is necessary before lake trout can be re-established in Lake Michigan.

The Director of the Bureau's Biological Laboratory at Ann Arbor warned that the lampricide may take some toll of fish in the Muskegon and other southern Michigan rivers yet to be treated. He said, "As we get to these southern streams which have a diversified population of both trout and warmwater fish, our problems become more difficult. We take every possible precaution and even run advance tests, but occasionally the chemical kills some fish. Most times, no game fish are lost. There is no way of predicting precisely what will happen on any particular treatment project."

An earlier treatment of the lower Boyne River in Charlevoix County caused some mortality among brown and brook trout. The Laboratory Director said brown trout seem particularly susceptible. He speculates that yellow pike (walleyes) may also be affected in the Mus-

kegon to some degree. On the other hand, there may be no mortality at all.

The Michigan Department of Conservation will observe with interest the lampricide treatment of the Muskegon. Any substantial losses of fish normally would be replaced by restocking by that Department if deemed necessary. (News Bulletin, Michigan Department of Conservation, October 1, 1964.)

Note: See Commercial Fisheries Review, September 1964 p. 21; August 1964 p. 28.

Gulf Fishery Investigations

Some of the highlights of studies conducted by the U.S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., during July-September 1964:

SHRIMP BIOLOGY PROGRAM: Shrimp Larvae Studies: Efforts during the quarter were largely directed toward culturing larvae of the seabob, Xiphopeneus kröyeri. Such larvae seem to be more demanding in their environmental requirements than are those of the brown shrimp, Penaeus aztecus, and more difficulty was encountered in rearing them. Viable eggs were obtained four times, but attempts to rear the larvae to the first postlarval stage were unsuccessful. The third protozoea was the most advanced stage attained.

Enumeration of planktonic-stage Penaeidae sorted from 166 plankton samples collected between March and June 1963 disclosed a marked increase in their relative abundance since the previous low in February. In general, the greatest concentrations of those planktonic forms occurred in the western portion of the study area (Port Aransas-Brownsville).

Representatives of the genus Penaeus, with greatest density at the 15- and 25-fathom stations, exhibited approximately a threefold increase in abundance over that observed in February. Analysis of monthly catches by developmental stage showed that in March approximately 45 percent of the catch was composed of postlarvae. In contrast, the numbers of postlarvae decreased over the next 3 months when nauplii and protozoeae made up the bulk of the sample catch. The observation that 70-95 percent of all planktonic Penaeus collected from April to June consisted of shrimp in the first two stages of larval development is indicative of appreciable spawning activity during that period.

Florida Bay Ecology Studies: A major objective of this project is to determine the density distribution of juvenile pink shrimp. Most attention during the quarter was given the final development and field testing of a device to obtain efficiently the necessary samples.

In a series of tank trials, the sampler consistently entrapped all of the test shrimp surrounded by the enclosure within 15 minutes of the time the repellent was released. During field tests on beds of "sea grass" (Thalassia and Diplanthera) in Biscayne Bay, as many as eight Penaeus shrimp were caught per one-half square meter of bottom. The device will next be observed under field conditions and on substrates typical of those characterizing areas in eastern Florida Bay over which young shrimp migrate from peripheral estuaries to Gulf fishing grounds off Dry Tortugas. In addition to Penaeus shrimp of 12 to 18 mm. total length, other organisms captured by the sampler included crabs, caridean shrimp, amphipods, isopods, stomatopods, hermit crabs, spiny lobsters, snails, and fish.

Abundance and Distribution of Larvae of Pink Shrimp on the Tortugas Shelf of Florida: During the cruise of July 7-9, low-velocity currents on the Tortugas grounds were measured with a Richardson automatic recording current meter. Observations extended over a period of 25 hours. A second trial in mid-August failed to give satisfactory information on current speed because of instrument failure. Plankton hauls were made at regular intervals over a $26\frac{1}{2}$-hour period in the area immediately adjacent to the site at which the current meter was used.

Bathythermograph observations disclosed the presence of an extremely strong thermocline at 6 out of 10 stations occupied over the period August 18-21. By September 1-3 it was evident at all but the shallowest station occupied (12 m.). The two final cruises scheduled for this study will be consolidated as a single cruise over the period September 28 to October 3. Its main objective will be to obtain data on the distribution of larvae over a wide area surrounding the Tortugas fishing grounds.

Computer processing of plankton data was initiated. An IBM format employing two cards is being utilized. (Conducted by University of Miami under contract.)

Juvenile Phase of the Life History of the Pink Shrimp: The numbers of juvenile pink shrimp (Penaeus duorarum) leaving the Whitewater Bay-Coot Bay estuary via Buttonwood Canal were considerably higher in the first 8 months of 1964 than during the same period of 1963. In 1963, peaks of relative abundance occurred in January, April, and September, the latter two being the largest and about equal in magnitude. Data for 1964, compared with those of the previous year, show a lesser peak in March and a larger one in June. The relative abundance of shrimp leaving the estuary in June 1964 was nearly three times that of April or September 1963. Periods of lowest abundance occurred during the winter and peaks of abundance were evident in spring, summer, and early fall.

Using preliminary summaries, provided by the Bureau, commercial landings of small shrimp (68 count and over) from the Tortugas grounds were compared with catches of subadults in Buttonwood Canal for each month since January 1963. The amount of time apparently required for shrimp to move from Buttonwood Canal to the Tortugas grounds ranges from 1 to 2 months. During periods of moderate abundance, the lag seems to be 1 month; in times of highest abundance it increases to 2 months. (Conducted by University of Miami under contract.)

SHRIMP DYNAMICS PROGRAM: Surveys of Postlarval Abundance and Fisheries for Bait (Juvenile) Shrimp: Postlarval shrimp are now being sampled routinely, once or twice a week, at four locations along the Texas coast (Sabine Pass, Gilchrist, Galveston, and Port Aransas). Collections are made with a 5-foot

beam trawl at each station with the exception of the one at Gilchrist. There, strong tidal flows make it more feasible to use a ½-meter plankton net. The table summarizes the results of recent collections from Galveston Entrance and Sabine Pass. Considerable time this quarter was devoted to processing material collected during several special studies last spring to investigate patterns of movement of postlarval brown and white shrimp as they enter the Galveston estuary.

Fig. 1 - Entrance to U. S. Bureau of Commercial Fisheries Biological Laboratory.

On two occasions during the quarter, large numbers of postlarvae collected at Port Aransas were transported to the salt-water laboratory where they are being reared to the juvenile stage. Subsamples from the collections are being preserved at 2-week intervals in order to develop a reference collection which will include early growth stages of the brown, white, and pink shrimp.

The harvest of bait shrimp from the Galveston Bay system during the first 8 months of this year has been considerably below production for the same period in 1963. Landings of small brown shrimp for bait decreased by 32 percent, and the production of white shrimp was 6 percent below last year's level. Predictions of the abundance of bait shrimp based on collections of postlarval brown shrimp during the spring of this year had indicated a decline of 36 percent below the level recorded in 1963.

Commercial Catch Sampling: Catch-sampling activities along the Texas and Louisiana coasts increased during the quarter in response to seasonal peaks in abundance of brown and white shrimp. Approximately 2,700 interviews were obtained by personnel stationed at Aransas Pass, Freeport, and Galveston, Tex., and at Morgan City, La. Interview information indicated that the center of the brown shrimp fishery throughout most of the third quarter was located in depths of 8 to 15 fathoms SSW. of Galveston where catches averaged about three boxes per night. Less than 2 percent by weight of the overall harvest in that area was discarded at sea, although as much as 40 percent (in the form of small shrimp) was culled from isolated catches. No record of discarding small white shrimp was obtained from vessels fishing in offshore waters between Galveston and Morgan City. Five trips were made aboard commercial shrimp vessels to observe actual discarding practices during the period.

The shrimp fleet at Key West, Fla., decreased in size to about 50 vessels in midsummer, although catches averaged close to four boxes per night. Interview information indicated that virtually no small pink shrimp were discarded during July, but beginning in August, approximately 20 percent by weight of catches made at 10 to 15 fathoms was culled. Observations made at sea aboard a commercial trawler revealed that 15 percent of its catch was discarded.

Migrations, Growth, and Mortality of Brown and White Shrimp: In the latter part of June, 2,180 tagged brown shrimp ranging in total length from 96 to 220 mm. were released in 14 to 17 fathoms off Freeport, Tex. To date, 152 (7 percent) have been returned. The distribution of these recoveries indicated little offshore movement in July and August. Only 5 shrimp were recovered beyond 20 fathoms, although considerable fishing effort was expended at greater depths. Coastwise movement also appeared to be restricted, as most of the shrimp were recaptured close to the release sites. The average distance traveled was less than 13 miles with the longest recorded movement being 115 miles.

In mid-August a total of 3,384 stained shrimp, ranging in size from 108 to 186 mm., was released at 13 to 17 fathoms off Freeport. By mid-September, 210 (6 percent) of those had been recovered.

Population Dynamics: Three cruises were made during the quarter to define further the selective characteristics of the meshes of shrimp nets. The validity of our experimental method, which compares the size of shrimp retained by cod-end meshes with the size of those that escape to the cod-end cover, was verified by a series of hauls in which nets with covered and uncovered cod-ends were towed simultaneously. No significant difference in the size of shrimp retained by either type of cod end was evident. Differential effects of the distance or duration of gear travel were investigated by comparing results from hauls in which the trawl was towed for periods of ½, 2, and 4 hours. The size of shrimp retained by the gear increased markedly during the longer tows, presumably because the shrimp had greater opportunity to escape. Comparisons of the selective action of cod ends constructed of various natural and synthetic fibers were inconclusive and will be repeated at a later date.

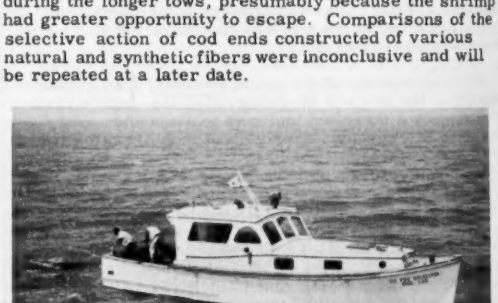


Fig. 2 - Bringing in a sample trawl on board the U. S. Bureau of Commercial Fisheries vessel Tommy Box in Galveston bay.

Abundance of Postlarval Shrimp in Mississippi Sound and Adjacent Waters: Regular sampling continued during the quarter. The postlarvae of all commercial penaeids collected through July were separated and identified. In August the quantity of debris, including dead eelgrass

and, more recently, Zoobotngon, increased at most stations. This slowed the process of separating shrimp to such a degree that specific determination of material in some samples remains imcomplete.

Catch per unit of sampling effort in July was well below that for July 1963. Numbers of postlarvae increased sharply in August and September, however, and 1964 averages were about 80 percent higher than in 1963. Brown shrimp accounted for much of the increase.

A study of the juveniles occurring in all samples collected through July 1964 has begun. The large numbers of postlarvae caught in the early part of 1964 were not reflected by the size of the juvenile population observed later in the season. (Conducted by Gulf Coast Research Laboratory under contract.)

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Synoptic hydrological and biological sampling under the revised scheme initiated in March 1964 continued during the quarter. A study of primary productivity in the Galveston estuary was initiated in July, and bottom fauna sampling was terminated in September, as planned, after 1 year. The white shrimp was the most numerous species taken in trawl samples during the quarter, followed in descending order of abundance by the Atlantic croaker, the brown shrimp, and the bay anchovy. Brown shrimp, which entered the estuary as postlarvae in the previous quarter, began their Gulfward migration as subadults, whereas white shrimp, which enter the system slightly later than the browns, did not reach peak abundance until midquarter. Both brown and white shrimp and the bay anchovy were present in fewer numbers than during the same period in 1963, with white shrimp numbers being only slightly reduced, brown shrimp numbers being down by slightly more than one-third, and anchovy numbers showing a decrease of more than two-thirds. The Atlantic croaker, on the other hand, exhibited more than a twofold increase over the previous year. Blue crab numbers were about the same as last year and not appreciably changed from the previous quarter.

Brown and white shrimp were concentrated in greatest numbers in the area near the mouth of the San Jacinto River. That area receives a large volume of industrial and municipal wastes via the Houston Ship Channel, yet its utility as a nursery environment for shrimp appears not to be suffering impairment.

Length-weight conversions have now been calculated for the Atlantic croaker, spot, sand sea trout, and bay anchovy, and will provide a distinct aid in future project research.

A study of the distribution and abundance of postlarval and early juvenile brown shrimp in Galveston Bay during 1963 and 1964 was completed. Preliminary findings indicate that postlarvae, upon entering the estuary from the Gulf, tend to move toward the peripheral marsh areas and bayous, utilizing predominantly the Houston Ship Channel, Intracoastal Waterway, and deeper waters of the bay as avenues of migration. They were observed to spread throughout the estuary and concentrate in the marshes and bayous within 2 weeks of first entry. The young shrimp spend 2 to 4 weeks, growing rapidly, in those highly productive edge areas, and as juveniles once again disperse throughout the estuary before eventually returning to the Gulf. Differences between temperature cycles in 1963 and 1964, during the time of postlarval influx and subsequent development, suggest that the duration of the estuarine phase of the brown shrimp's life history is regulated in large part by water temperature through its probable effect on rate of growth.

INDUSTRIAL BOTTOMFISH FISHERY PROGRAM: Life Histories of Central Gulf Bottomfish: Analysis of samples regularly drawn from industrial bottomfish catches made near shore east of the Delta since 1959 has shown that a seasonal increase in the abundance of croaker occurred during May-June in each year except 1960. In June 1964, the croaker catch per hour amounted to only 0.13 tons, compared with the monthly average of 0.35 tons calculated for the period 1959-63. Moreover, statistics of species composition revealed that the croaker stock contributed but 16 percent to the overall June catch, in contrast to its 5-year (monthly) average of 48 percent. Fish were more abundant offshore in 20 fathoms where thay made up 51 percent of the total catch, with trawl hauls there averaging 0.33 tons per hour. Population age structure, as determined from length frequency data, revealed that yearling fish were largely present near shore, while fish predominantly 2 and 3 years old were caught offshore. Increased catches of croaker were evident near shore in July, and by August the species catch-per-unit-of-effort and percentage contribution again reached normal levels. The entire catch from the near shore grounds consisted largely of 1- and 2-year-old fish with older individuals being dominant. The data also suggest that age group II, upon which the fishery primarily depends during summer, did not attain normal proportions on near-shore grounds until August after its members had moved in from offshore.

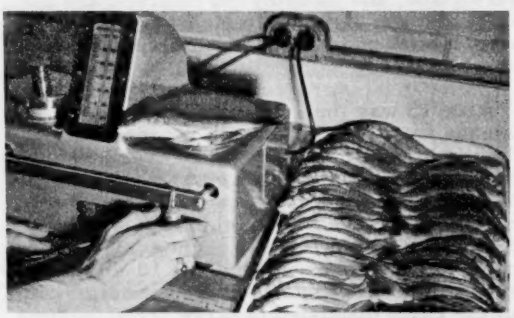


Fig. 3 - Weighing specimens of Atlantic croaker (Micropogon undulatus) in the laboratory.

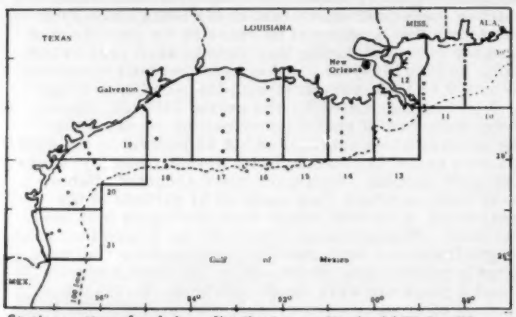
Samples of juvenile croaker collected in Mobile Bay by personnel of the Alabama Marine Resources Laboratory, as well as adult croaker taken off the northern Gulf coast by Bureau biologists at Galveston, continued to be processed for life history data.

Note: See Commercial Fisheries Review, July 1964 p. 15.

* * * * *

SHRIMP DISTRIBUTION STUDIES: M/V "Gus III" Cruise GUS-21 (September 17-29, 1964): Catches of brown shrimp from several statistical areas ran to large sizes (from 12-15 to 21-25 to the pound) during

this shrimp sampling cruise in the Gulf of Mexico by the chartered research vessel Gus III, operated by the U.S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex.



Station pattern for shrimp distribution studies by M/V Gus III, Cruise GUS-21.

Eight statistical areas extending from off the Louisiana coast to Texas were covered and standard 3-hour tows with a 45-foot shrimp trawl were made. During this cruise, 38 tows with the 45-foot flat trawl and 80 plankton tows were made, and 34 bathythermograph and 120 water (Nansen bottle) samples were taken. Also, a total of 144 drift bottles were cast at 26 stations.

Area 13 was the most productive, with catches from the three depth ranges totaling slightly below 100 pounds. The over 20-fathom depth of that area yielded 51 pounds of 21-25 count brown shrimp--the largest haul of the cruise--as well as a relatively large catch (36 pounds) of white 15-20 count shrimp from the under 10-fathom depth. The 10-20 fathom depth of the area accounted for a smaller haul, but the catch consisted of large brown shrimp.

The over 20-fathom depth in area 17, 18, 20, and 21 was productive for large brown shrimp, followed by moderate to good catches of smaller shrimp of the same species in 10-20 fathoms. Some white shrimp also were taken from those areas--the largest catch consisting of 13 pounds in 10-20 fathoms of area 21.

Area 19 accounted for an 18-pound catch of 26-30 brown shrimp in 10-20 fathoms and 12 pounds of white 12-15 count shrimp from the under 10-fathom depth range.

Small quantities of pink shrimp of various sizes ranging from under 1 pound up to 2 pounds were taken from most areas.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.
(2) See Commercial Fisheries Review, Nov. 1964 p. 34.

Industrial Fishery Products

CALCIUM AND PHOSPHORUS IN FISH MEAL FOUND ENTIRELY AVAILABLE TO CHICKENS:

Menhaden fish meal contains, on the average, 5.5 percent calcium and 3 percent phosphorus; the values of those minerals in a ton of fish meal are about $1 and $13, respectively. It generally has been assumed that those minerals are nutritionally completely available when consumed by fowl, swine, and other animals, but this was never established experimentally until recently. Now, on the basis of research at the U.S. Bureau of Commercial Fisheries Technological Laboratory, College Park, Md., it is known that both the calcium and phophorus of fish meal are entirely available to chickens.

These findings were established by comparing the results of feeding chicks diets containing di-calcium phosphate and limestone at various levels with the results of feeding 12 different samples of menhaden meal at two different levels and menhaden meal ash also at those levels. Both levels were low enough to constitute a sensitive assay of the effects of changing the amounts of the two minerals in the rations. Fish meal ash at two levels was included to determine if it contains trace minerals that would have any observable effects on bone mineralization in the nonfish meal diet. Levels of minerals deposited in the bones of test chicks were measured to determine whether there were differences between test chicks fed fish meal rations and those fed rations containing minerals from inorganic sources or from fish meal ash. Because no important differences were observed, it was concluded that calcium and phosphorus in fish meal are completely available to chickens.

The Bureau's laboratory research on the subject was reported on August 5, 1964, at the 53rd Annual Meeting of the Poultry Science Association held at the University of

Minnesota, St. Paul, Minn. (Technical Advisory Unit, U.S. Bureau of Commercial Fisheries, Boston, Mass.)

* * * * *

VIEWS ON USE OF FISH MEAL AND OIL IN ANIMAL NUTRITION:

The Arkansas Formula Feed Conference held in September 1964 at Fayetteville, Ark., was sponsored by the Arkansas Feed Manufacturers Association and the Department of Animal Industry of the State University. The Conference was attended by a nutritionist of the U. S. Bureau of Commercial Fisheries, Technical Advisory Unit, Boston, Mass. Following the meeting he visited mixed feed manufacturers in southern Missouri and Tennessee, and also the Tennessee Agricultural Experiment Station at Knoxville.

To the extent that they dealt with proteins and other nutrients contained in fish meal, all of the conference papers on poultry and swine nutrition had important bearings on industrial fishery products. As an example of the relation between the information offered and practical utilization of fish meal, it is worthy of note that three different conference speakers stressed the importance of avoiding excess calcium in poultry feeds. Such an excess, it was reported, tends to limit both growth and egg production of chickens, and growth and feed efficiency of turkeys and acts as well to produce leg weakness in this species. It appears that feed formulators must place maximum limits upon the total calcium in poultry rations in addition to the minima already used. If this is done, the calcium in fish meal and other feed ingredients must be entered into the calculations: thus fish meal will be given credit for its calcium content. In addition, if the calcium value of fish meal is recognized, logically the phosphorus value of the meal will also be taken into account. The result should be a recognition of the calcium and phosphorus values of fish meal, values that are from a monetary point of view, respectively $1 and $13 per ton. In the past the mineral values of fish meal have largely been neglected by formulators.

Some mixed feed manufacturers visited by the nutritionist expressed concern with the prospective shortage of fish meal and advancing prices of industrial fishery products. But none reported having reduced fish meal levels in their products within the past year.

At the Tennessee Agricultural Experiment Station, investigators are studying the UGF (unidentified growth factor) content of fish meal in relation to poultry requirements and the possibility of using fish oil in ruminant feeding. The UGF studies have shown that as little as 1 percent of fish meal in poultry rations will produce the maximum growth stimulus obtainable with UGF. This work has been repeated a second time with confirmatory results and will be repeated again. The experiments with fish oil involved feeding menhaden oil to calves starting at the age of 7 days. The animals grew well when the oil level was around 2 percent of the concentrate mixture. But when the oil level was raised to 5 percent, those young calves consumed less concentrate and more hay with a resulting lowering of the energy intake and decreased growth rate. The results indicate that menhaden oil can be used to good advantage at a level of 2 percent--a level at which fats and oils are frequently used to control losses in the form of dust from ground and chopped feed mixtures. Such use of fish oil would, of course, be uneconomical at present prices but would become feasible if the price of fish oil should drop low enough to make it competitive with the oils and fats presently used in animal feeding. (Technical Advisory Unit, U. S. Bureau of Commercial Fisheries, Boston, Mass., October 16, 1964.)

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U.S. FISH MEAL, OIL, AND SOLUBLES: Production by Areas, September 1964:

Preliminary data on U.S. production of fish meal, oil, and solubles for September 1964 as collected by the U.S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U. S. Production 1/ of Fish Meal, Oil, and Solubles by Areas, September 1964 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles	Homogenized 3/
	Short Tons	1,000 Pounds	. . . . (Short Tons)	
September 1964:				
East & Gulf Coasts	20,296	17,898	7,996	-
West Coast 2/	2,720	750	1,649	-
Total	23,016	18,648	9,645	-
Jan.-Sept. 1964 Total	185,832	152,826	74,082	-
Jan.-Sept. 1963 Total	194,062	153,746	76,934	7,224

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.
3/Includes condensed fish.

* * * * *

Major Indicators for U. S. Supply, August 1964: United States production of fish meal in August 1964 was lower by 26.0 percent as compared with August 1963. Production of

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, August 1964

Item and Period	1/1964	1963	1962	1961	1960
	. . . . (Short Tons)				
Fish Meal:					
Production:					
August	31,880	43,069	40,440	57,537	51,248
January-August	2/162,816	172,613	217,878	223,474	187,741
Year 3/	-	253,452	312,259	311,265	290,137
Imports:					
August	36,543	43,987	28,253	19,026	8,340
January-August	321,835	269,144	194,996	145,562	87,846
Year	-	383,107	252,307	217,845	131,561
Fish Solubles:					
Production: 4/					
August	13,361	18,770	16,811	19,685	16,921
January-August	2/ 64,437	80,066	90,525	82,474	72,743
Year	-	107,402	124,649	112,254	98,929
Imports:					
August	125	-	422	318	180
January-August	3,682	2,769	5,018	2,245	2,794
Year	-	6,773	6,308	6,739	3,174
	. . . . (1,000 Lbs.). . . .				
Fish Oils:					
Production:					
August	26,131	34,610	33,394	49,671	36,912
January-August	2/134,178	133,189	176,718	195,935	133,739
Year	-	185,827	250,075	258,118	290,143
Exports:					
August	9,664	37,455	33,272	13,304	1,395
January-August	106,252	164,604	96,405	85,853	94,819
Year	-	262,342	123,050	122,486	143,609

1/ Preliminary.
2/ Data for 1964 based on reports which accounted for the following percentage of production in 1963: Fish meal, 95 percent; solubles and homogenized fish, 99 percent; and fish oils, 99 percent.
3/Small amounts (10,000 to 25,000 pounds) of shellfish and marine animal meal and scrap not reported monthly are included in annual totals.
4/Includes homogenized fish prior to 1964--none produced in 1964.

fish oil was down by 24.5 percent and production of fish solubles decreased 28.8 percent.

* * * * *

Production, August 1964: During August 1964, a total of 26.1 million pounds of marine-animal oils and 31,880 tons of fish meal was produced in the United States. Compared with August 1963 this was a decrease of 8.5 million pounds of marine-animal oils and 11,189 tons of fish meal and scrap. Fish solubles production amounted to 13,361 tons--a decrease of 5,409 tons as compared with August 1963.

Menhaden oil production amounted to 22.2 million pounds--a decrease of 8.4 million pounds. Menhaden fish meal and scrap production in August 1964 amounted to 24,866 tons--a decrease of 10,548 tons as compared with the same month of 1963.

U.S. Production of Fish Meal, Oil, and Solubles, August 1964 1/ with Comparisons

Product	August		Jan.-Aug.		Total
	1/1964	1963	1/1964	1963	1963
	(Short Tons)				
Fish Meal and Scrap:					
Herring	2,179	2,693	8,087	5,312	7,537
Menhaden 2/	24,866	35,414	120,972	135,119	181,750
Tuna and mackerel	2,854	2,318	17,428	13,969	26,957
Unclassified	1,981	2,644	16,329	18,213	22,415
Total	31,880	43,069	162,816	172,613	238,659
Shellfish, marine-animal meal and scrap	3/	3/	3/	3/	14,793
Grand total meal and scrap	3/	3/	3/	3/	253,452
Fish solubles:					
Menhaden	11,436	15,442	51,754	55,515	74,831
Other	1,925	3,328	12,683	17,417	25,347
Total	13,361	18,770	64,437	72,932	100,178
Homogenized condensed fish	-	762	-	7,134	7,224
	(1,000 Pounds)				
Oil, body:					
Herring	2,357	2,115	9,519	4,630	5,709
Menhaden 2/	22,176	30,580	116,806	120,872	167,635
Tuna and mackerel	899	715	3,293	2,745	5,735
Other (including whale)	699	1,200	4,560	4,942	6,748
Total oil	26,131	34,610	134,178	133,189	185,827

1/Preliminary data.
2/Includes a small quantity of thread herring.
3/Not available on a monthly basis.

* * * * *

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-August 1964: Based on domestic production and imports, the United States available supply of fish meal for January-August 1964 amounted to 484,651 short tons--42,894 tons (or 9.7 percent) more than during January-August 1963. Domestic production was 9,797 tons (or 5.7 percent) less, but imports were 52,691 tons (or 19.6 percent) higher than in January-August 1963. Peru continued to lead other countries with shipments of 257,604 tons.

The United States supply of fish solubles during January-August 1964 amounted to 68,119 tons--a decrease of 17.8 percent as compared with the same period in 1963. Domestic production dropped 19.5 percent but imports of fish solubles increased 33.0 percent.

U. S. Supply of Fish Meal and Solubles, January-August 1964 with Comparisons

Item	Jan.-Aug.		Total
	1/1964	1963	1963
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	120,972	135,119	181,750
Tuna and mackerel	17,428	13,969	26,957
Herring	8,087	5,312	7,537
Other	16,329	18,213	37,208
Total production	162,816	172,613	253,452
Imports:			
Canada	38,678	35,739	50,925
Peru	257,604	201,764	291,544
Chile	11,082	22,637	24,249
Norway	-	1,819	1,819
So. Africa Republic	11,938	5,975	12,296
Other countries	2,533	1,210	2,274
Total imports	321,835	269,144	383,107
Available fish meal supply	484,651	441,757	636,559
Fish Solubles:			
Domestic production 2/	64,437	3/80,066	3/107,402
Imports:			
Canada	1,162	1,541	2,034
Iceland	-	-	180
So. Africa Republic	860	191	411
Other countries	1,660	1,037	4,168
Total imports	3,682	2,769	6,773
Available fish solubles supply	68,119	82,835	114,175

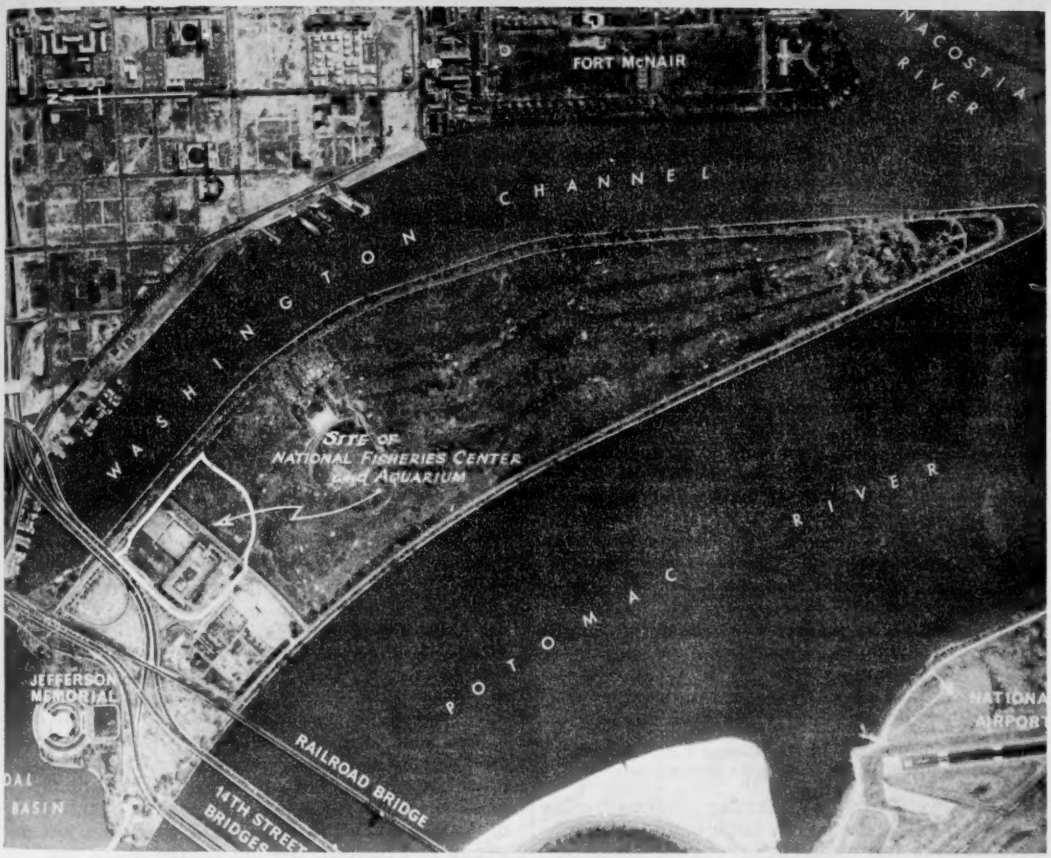
1/Preliminary.
2/50-percent solids.
3/Includes production of homogenized condensed fish.

National Fisheries Center and Aquarium

NEW PLANS APPROVED:

Plans under which the National Fisheries Center and Aquarium is to be built in East Potomac Park, Washington, D. C., were completed and approved by Secretary of the Interior Stewart L. Udall this past fall, and architects were proceeding with work on designs and specifications.

The new plans gave consideration to the redesigning and shortening of a nearby golf course in East Potomac Park which is used by golfers practically year-round. The new arrangement provides a total of 22 acres for the Fisheries Center and Aquarium, with construction slated to start early in 1966, and completion tentatively set for early 1968. The Center is expected to be the finest of its type in the world and will constitute a center for scientific research, as well as a showplace for aquatic life of all kinds.



Shows site of National Fisheries Center and Aquarium, Washington, D. C., construction of which will be completed in early 1968.

Legislation by Congress in 1962 authorized $10 million for construction of the facility but with the proviso that it be self-supporting, and requiring the repayment of construction and operational costs. This will be done by charging a visitor's admission fee to all except supervised youth groups. Visitors to the Fisheries Center and Aquarium are expected to number more than 3 million annually.

Note: See Commercial Fisheries Review, July 1964 p. 21; May 1964 p. 26; April 1964 p. 22.

North Atlantic

FOREIGN FISHING ACTIVITIES OFF COAST, OCTOBER 1964:

In order to observe foreign fishing activities in the North Atlantic, the staff of the Fisheries Resource Management Office, U.S. Bureau of Commercial Fisheries, Gloucester, Mass., has been conducting weekly reconnaissance flights cooperatively with the U.S. Coast Guard.

During October 1964, a total of 47 Soviet fishing vessels was observed on Georges Bank in the North Atlantic. They were identified by type vessel as: 35 factory stern trawlers (BMRT, RRT, RMT); 9 fish transports; 3 fuel and water tankers. One Polish B-15 factory stern trawler was seen several times fishing with the Soviet fleet. Soviet

medium class side trawlers (SRT, SRT-R) left Georges Bank early in October. Their early departure may have been due to bad weather, as well as a lack of fish. A year earlier in October, 26 Soviet medium trawlers were still fishing on Georges Bank.

A typical stern trawler that fishes on Georges Bank. Entire cod-end with a catch of herring starts up the stern ramp.

A steady decline in herring catches by the Soviet trawlers was very noticeable during October. As the month progressed, it was observed that fewer trawlers had deckloads of herring, nor were the fish meal plants aboard the factoryships in constant operation.

By the end of October, the Soviet fishing fleet was spread out over Georges Bank, with groups of 3 or 4 vessels to as many as 25 to 30 fishing together. With few exceptions, all of the Soviet vessels observed during October were from the Port of Murmansk on Barents Sea. (Gloucester, Mass., November 9, 1964.)

North Atlantic Fisheries Explorations and Gear Development

EXPERIMENTS ON OFF-BOTTOM TRAWLING AS AGAINST CONVENTIONAL TRAWLING:

M/V "Delaware" Cruise 64-8 (September 17-22, 1964): To effect the adjustments required for satisfactory performance and the experimental fishing of (1) a number 41 manila ottor-trawl, and (2) a nylon midwater trawl in an "off-the-bottom" manner was the purpose of this cruise, mostly in Ipswich Bay, by the U.S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware. Both nets were rigged to fish with the footrope between 1 and 3 fathoms above the bottom when towed behind regular bottom-type trawl doors. After being rigged to satisfactorily fish in that manner, the nets were to be set on concentrations of ocean perch (redfish) or other groundfish (such as cod and haddock) when they were found to occur a few fathoms off the bottom.

Fish traces were observed on a white-line echo-sounder and scope. By means of a headrope-mounted transducer and a conductor cable to the ship (third wire), the distance the headrope was above the bottom and also the net opening were either recorded on an echo-sounder paper or were measured on the fish-scope tube.

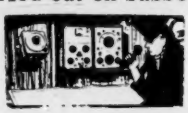
The first three days of the cruise were spent in Ipswich Bay experimenting with various numbers of floats, weights, and lengths of ground cables needed to float the net at the desired height above the bottom. The number 41 net was originally fitted with three 15-foot sections of rollers, 8-inch aluminum floats, (35 of them), 5-fathom legs, and 10-fathom ground cables. By lengthening the ground cables to 20 fathoms and adding 14 floats to the wings and bosom, the net fished about one fathom off the bottom and kept the same vertical distance between headrope and footrope (9 feet). Later, the rigging of the net was modified by removing the roller sections and replacing them with a chain footrope. A 3-fathom dropper line of one-half inch chain was hung from each lower wing end and the number of floats was increased to 71 (including 3 along each gore in the belly section). The trawl then fished $1\frac{1}{2}$ fathoms above the bottom. With that arrangement, the net fished at a fairly constant height; as the net tended to lift or settle additional or decreased weight (or downpull) was exerted by the dropper chain as the length of chain supported by the bottom changed.

A "Herman Engel" nylon midwater trawl was fished with the 4 x 8-foot bottom doors using 20-fathom ground cables and 35-fathom legs. The addition of a 15 fathom third leg, extending from the gore at the wing end of the net to a shackle on the bottom leg and 15 fathoms

from the net, allowed the vertical opening of the net to increase from 18 to 36 feet. With 8-inch floats (76 of them) on the headrope, this net fished with the footrope 1 to 2 fathoms above the bottom and reached a headrope height of 7 fathoms.

Because of the threat of hurricane Gladys, the full objectives of the cruise were not fulfilled. No concentrations of food fish were seen on the echo-sounder and no significant catches of either ocean perch (redfish) or groundfish were made. But the mid-water trawl caught about 7,000 pounds of dogfish in Ipswich Bay during the preliminary trials. The tracing of that school (on the sounder) was from near the bottom to 4 fathoms above the bottom and was extremely dense.

Gear rigged in a similar manner may prove to be effective in harvesting schools of fish which are above the reach of trawls rigged to fish on the bottom in the conventional manner. The changeover can be done quite rapidly and with little expense. Interim use of this method as an alternate to conventional trawling would be compatible with normal fishing routine. Further experiments are to be carried out on subsequent cruises.



North Atlantic Fisheries Investigations

SEA SCALLOP POPULATION SURVEY ON GEORGES BANK CONTINUED:

M/V "Albatross IV" Cruise 64-12 (October 7-15, 1964): To collect data on the distribution and abundance of sea scallops at the major scallop grounds on Georges Bank and to obtain sediment samples from the ocean floor were the objectives of this cruise by the U.S. Bureau of Commercial Fisheries research vessel Albatross IV.

During the cruise a total of 152 tows was made at 144 stations using a 10-foot standard scallop dredge with a 2-inch ring bag. Some 26 bottom samples were collected at 8 designated stations and 6 tows at 4 stations were made with the beam trawl, 2 of which were made with a camera mounted on the beam trawl frame.

About 150 live red hake taken on the cruise were returned to the Bureau's Woods Hole Biological Laboratory for studies on their sensory apparatus and 50 live sea scallops were brought back to the laboratory for spawning studies. Sex ratios of scallops were taken at 17 stations during the cruise.

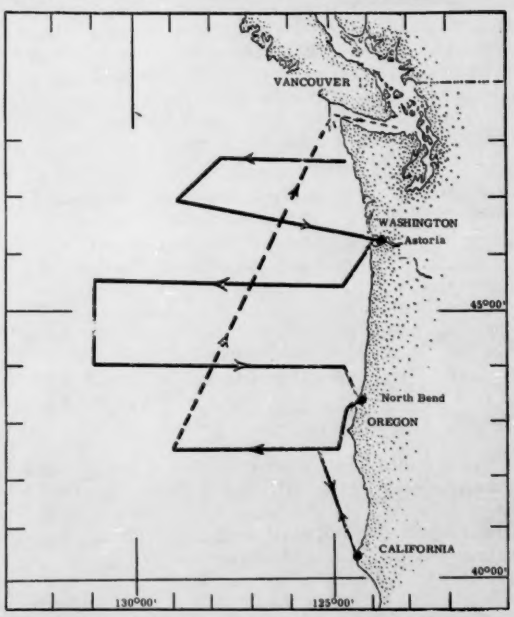
Hydographic information was collected from 170 bathythermograph casts made at each station at hourly intervals while under way.

Note: See Commercial Fisheries Review, August 1964 p. 34; August 1963 p. 41.

North Pacific Fisheries Explorations and Gear Development

ALBACORE TUNA ABUNDANCE AND DISTRIBUTION SURVEY:

M/V "John N. Cobb" Cruise 66 (July 13-31, 1964): To obtain information on the abundance and distribution of albacore tuna (Thunnus alalunga) and other pelagic fish species was the principal objective of this cruise by the U.S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.



Shows trackline during Cruise 66 of the exploratory fishing vessel John N. Cobb, July 13-31, 1964.

The area of operations during the three-week cruise was off the Washington, Oregon, and California coasts extending from about 20 miles off the coast to 250 miles offshore (longitude 130° 00' W.) between latitude 47° 50' N. and 41° 07' N. Basic oceanographic data were collected along the trackline by staff members from the Bureau's Biological Laboratory, San Diego, Calif. The trackline covered a distance of about 1,300 miles.

The cruise was interrupted by several unscheduled port calls, a stop at Coos Bay for repairs to the vessel's steering system, and also curtailed sea operations for several days because of bad weather.

A total of 16 stations were occupied for the collection of oceanographic data which included salinity, oxygen, and chlorophyl determinations. Between stations, 32 bathythermograph (BT) casts and surface water temperature readings were taken. A continuous watch was maintained during daylight hours for schools of tuna, other pelagic fish, bird flocks, mammals, and other aquatic life.

Trolling, using 7 lines towed at a speed of about 7 knots, was generally conducted during daylight hours. A red-and-white feathered jig was the most common lure used. Those were supplemented on occasion by green-and-white or yellow-and-white feathered jigs or by light or dark colored bone-type jigs. Strikes and catches of albacore tuna were distributed about equally between the 7 lines. Most of the tuna were caught on the southernmost extension of the trackline.

A total of 74 albacore tuna was caught, of which 24 viable fish were tagged and released. Blood samples were immediately taken from the other tuna, and the carcasses frozen for future biological studies. Lengths of the albacore varied from 55 to 79 centimeters (21.7 to 31.1 inches) with about 66 percent ranging between 61 to 65 centimeters (24.0 to 25.6 inches). Samples ranged from 7.5 to 22.5 pounds with 70 percent between 10.5 and 13 pounds.

Night-light stations were fished using both monofilament nylon gillnets with mesh sizes ranging from 1" to 1½" and of lengths 3 to 7 fathoms long, and small-mesh dip nets. No concentrations or schools of fish were observed at those stations. Best catches for each effort varied from 2 or 3 individuals for lanternfish (Myctophidae), sablefish (Anoplopoma fimbria), anchovy (Engraulis mordax), and stickleback (Gasterosteidae), and up to 20 to 25 for saury (Cololabis saira), and squid (Loligo opalescens).

The John N. Cobb was scheduled to leave Seattle, October 19 for five weeks of exploratory midwater trawling in Puget Sound and along the Washington coast. That work was to be carried out in cooperation with the Washington State Department of Fisheries.

Objectives of the cruise were to: (1) investigate the distribution and abundance of hake, (2) evaluate the incidental catches of other pelagic fishes taken with the midwater trawl, and (3) cooperate in evaluating the fishing effectiveness of a midwater net by two-boat trawling.

Note: See Commercial Fisheries Review, September 1964 p. 32.

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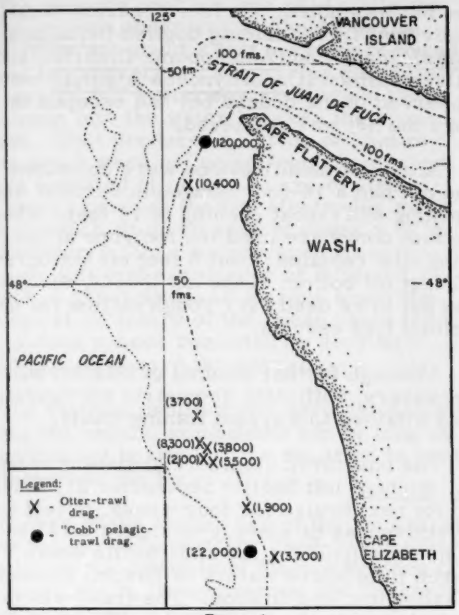
HAKE DISTRIBUTION AND ABUNDANCE EXPLORED:

M/V "John N. Cobb" Cruise 67 (August 10-October 9, 1964): To explore the depth (bathymetric) and geographic distribution of the hake resources off the Washington and Oregon coasts was the primary objective of this 8-week cruise by the U.S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb. Secondary objectives were to attempt to assess the amount of the hake resources and to collect pertinent data on the environmental factors influencing distribution and abundance patterns.

Sounding transects were run in an onshore-offshore direction at oblique angles to the coast at depths from 20 to 130 fathoms. When hake concentrations were located, the availability was measured with the 400-mesh eastern otter trawl or the "Cobb" pelagic (midwater) trawl.

Length-frequency and sex-ratio data were collected from most of the successful drags and a cursory examination was made for stomach contents. Surface-to-bottom and fishing gear depth-water temperatures were taken during the cruise.

Large concentrations of hake were found from the Strait of Juan de Fuca, Wash., to the Umpqua River, Ore. The largest catch, which was made with the "Cobb" pelagic trawl off Mukkaw Bay, Wash., in 53 to 55 fathoms, yielded 60,000 pounds of hake per one-half hour fished or an hourly rate of 120,000 pounds.



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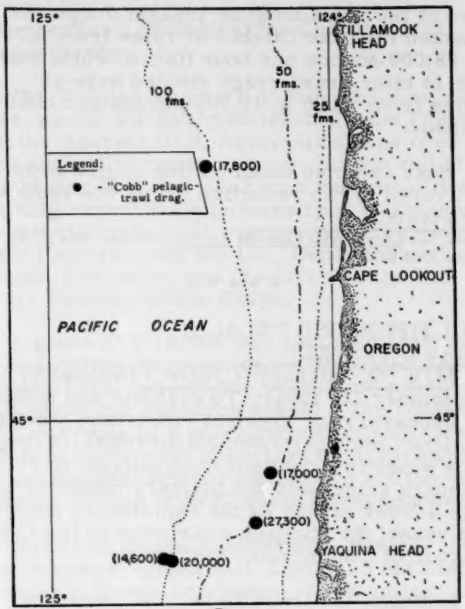

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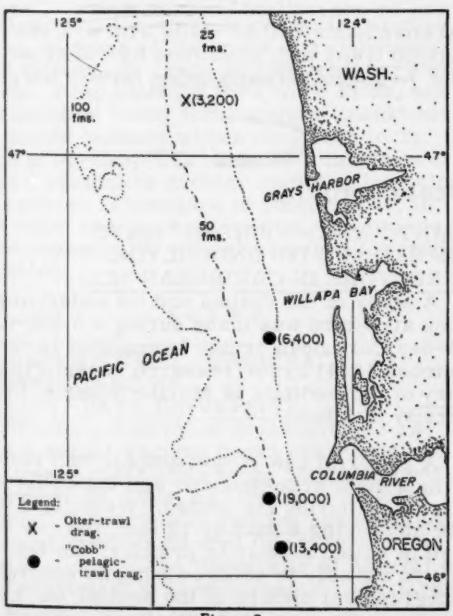

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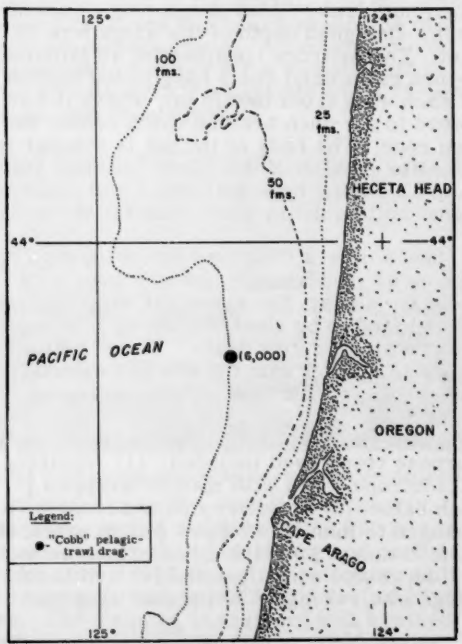

Figure 4

John N. Cobb Cruise 67 (August 10–October 9, 1964); hourly catch rates and locations of otter-trawl and "Cobb" pelagic-trawl drags which yielded: Fig. 1 - over 1,000 and 5,000 pounds per hour fished, respectively; and figs. 2, 3 and 4 over 5,000 pounds per hour fished.

Ten of the remaining 21 pelagic drags accounted for hake catches at rates from 6,000 to 28,000 pounds per hour fished, while 9 of the 14 otter-trawl drags yielded hake at rates from 1,200 to 10,700 pounds per hour fished.

Hake samples taken on this cruise were delivered to two reduction plants for reduction tests.

Note: See Commercial Fisheries Review, October 1964 p. 30; June 1964 p. 21.

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MULTIPURPOSE PELAGIC TRAWL TESTED:

M/V "St. Michael" Cruise 3 (August 17-September 11, 1964): To evaluate and modify, as necessary for greatest efficiency, a newly designed multipurpose pelagic trawl (having long wings in a configuration similar to a lampara seine) was the primary objective of this 4-week cruise by the exploratory fishing vessel St. Michael, chartered by the U.S. Bureau of Commercial Fisheries.

Initially, the trawl had a total headrope length of 99 fathoms and was held open by 92 aluminum trawl floats measuring 8 inches each. Designed depth of the wings was 30 feet. The footrope consisted of 40 fathoms $\frac{3}{8}$-inch galvanized chain hung to the bottom of each wing from the tip aft, where it was joined to a $\frac{1}{2}$-inch braided nylon center section rope. The body of the net is similar to the after portion of the "Cobb" pelagic trawl. Both aluminum hydrofoil doors and conventional bottom doors were tested with the net.

Scuba divers evaluated the net design by means of underwater observations and measurements. Net spread at wing tips was determined to be about 84 feet as a pelagic trawl with hydrofoil doors. Use of bottom doors in contact with the sea bed extended the opening to 108 feet.

The necessary modifications to the multipurpose trawl used included: (1) replacing all footrope chain with manila-wrapped $\frac{1}{2}$-inch cable; (2) braided nylon headrope was changed to manila-wrapped $\frac{3}{8}$-inch cable; (3) installation of 10-fathom dandylines between the doors and wing tips; and (4) web in the wings was rehung to 30 percent hang-in.

Divers made observations on various fish species which entered into the influence of the net. Evidence of fish swimming out of the net was noted. On four separate occasions individual fish including dogfish (Squalus acanthias), black cod (Anoplopoma fimbria), and silver salmon (Oncorhynchus kisutch) were observed in the codend but had escaped before the net was retrieved.

After the modifications were completed, the net had a 16-foot maximum vertical wing opening and throat opening of 18 feet. When bottom doors are used the footrope at the wing tips remains about 6 feet off bottom and 15 feet off bottom at the net throat, permitting the net to be used over rough bottom for near-bottom fish species.

Although further studies of this net will be necessary, sufficient geometric configuration was attained to warrant fishing trials.

The chartered commercial fishing vessel St. Michael left Seattle September 21, 1964, on its next cruise for four weeks, to test the effectiveness of a newly-designed trawl on concentrations of hake and Pacific ocean perch in offshore waters of British Columbia, Washington, and Oregon. The trawl was to be fished near bottom, using aluminum hydrofoil doors or conventional bottom doors. Comparative hauls will be made with a "Cobb" pelagic trawl with aluminum hydrofoil doors.

Note: See Commercial Fisheries Review, November 1964 p. 47.

Oceanography

GIANT "ECHO-SOUNDER" MAPS SEABED AND ITS UNDERLYING STRUCTURE IN CARIBBEAN SEA:

A study of the seabed and its underlying rock structure was made during a 5,500-mile, 43-day Caribbean cruise (completed in early October 1964) by the research vessel Pillsbury of the Institute of Marine Science, University of Miami.

A powerful new oceanographic tool resembling a giant echo-sounder was tested for the first time during the cruise. Weighing 6 tons and measuring 8 by 8 by 12 feet, the new device is called a seismic profiler. Its function is not only to produce a highly accurate topographical picture of the seabed, but also to reveal the layers of rock far below and what they are made of.

The seismic profiler was used while the Pillsbury was under way at about 3 knots. Electrodes set about 2 feet apart were towed behind the vessel, and a powerful electrical current (20,000 volts) was discharged every 4 seconds into the water between the electrodes. That produced a series of loud reports which were reflected from the seabed. (When operated at night, the arc of electrical energy between the two electrodes made a flash which lit up an area of ocean a mile in diameter.) Since sound waves travel through different substances at different speeds, a great deal was learned about the geological structure of the ocean basin from the various echoes recorded by sensitive microphones aboard the vessel.

The seismic profiler was used extensively during the cruise, sometimes for as long as 30 continuous hours. It was reported to have performed perfectly.

Studies of the seabed and of the rock structures below it are part of a long-range investigation by the Institute of Marine Science of the ocean basin, its sediments, and its geological structure.

Along with the seismic reflection studies, bottom samples of the rocks and sediments were obtained by grabs and by dredging and coring. Deep plankton tows were made, and specimens of living foraminifera (planktonic one-celled animals whose skeletons form much of the deep-sea bottom sediments) were taken from depths greater than 2 miles below the surface. Thousands of photographs, in both color and black-and-white, were made of the seabed with special cameras lowered on cables.

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RESEARCH VESSEL "YAQUINA" COMMISSIONED BY OREGON STATE UNIVERSITY:

The newly converted oceanographic research vessel Yaquina began operations off the Oregon coast after being commissioned September 28, 1964, by Oregon State University. The 180-foot Yaquina has replaced the much smaller 80-foot Acona (which has been assigned to the University of Alaska) of the Department of Oceanography. The larger vessel will permit more student participation in oceanographic research; it will allow biologists to use larger nets, trawls, and dredges to greater depths; and it will expand Oregon State University programs in physical, chemical, geological, and geophysical oceanography.

The Yaquina was built in New Orleans, in 1944, as the FS-210, a sistership to the Trident and the Agassiz (U.S. Army Air Corps overhaul and maintenance vessel). At the end of World War II it was used as a reserve officer training vessel at the University of Washington for several years. It was assigned to Oregon State University by the U.S. Department of Health, Education, and Welfare and the U.S. Army Transportation Corps.

A grant of $770,000 was received from the Oceanography Program of the National Science Foundation to convert the vessel into a modern oceanographic research vessel. The conversion was done in a shipyard in Portland, Oreg. Funds to operate the vessel are being furnished by the National Science Foundation and the Geophysics Branch of the Office of Naval Research.

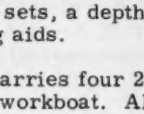
Statistics on the Yaquina are: length--180 feet; tonnage--gross 800, displacement 666; speed--11 knots; and range--6,500 miles, 35 days. Six scientific laboratories are located on the main deck of the vessel, and one hold has been reserved for future expansion of scientific laboratory space. Accommodations are provided on board for a complement of 40 which will include scientists and a 15- or 20-man operating crew.

Research vessel Yaquina outfitted for oceanographic investigations.

All winches on the vessel are electric. The hydrographic winch holds 30,000 feet of $\frac{3}{16}$-inch wire rope; the dredging and coring winch holds 30,000 feet of $\frac{1}{2}$-inch wire; and the trawling winch holds 20,000 feet of $\frac{3}{8}$-inch wire. The Yaquina is equipped with a retractable bow thruster powered by a 200-horsepower Diesel engine. Navy-licensed stabilizing tanks have been installed in the number

two hold. Deck equipment includes a crane on the stern, a hydraulic A-frame mounted across the stern, and a hydraulic tripod boom on the main deck. The electronic equipment carried includes 2 loran sets, 2 marine radios, 2 radar sets, a depth finder, and other navigating aids.

The vessel carries four 20-man inflatable life rafts and a workboat. Although the 22-foot gasoline-powered workboat is designed to operate in rough water, it will make up to 30 miles per hour under good conditions. It is launched with high-speed hydraulic-powered davits.



Oregon

SILVER SALMON TRANSPLANTS MAY HELP REBUILD SANDY RIVER RUNS:

Over 1,600 adult silver salmon have been transplanted in the Sandy River. Surplus hatchery salmon from the lower part of the Sandy River were transferred to upstream tributaries which contain only remnants of their once great salmon runs. The possibility of rebuilding those runs has been enhanced by improved fish passage conditions over Marmot Dam. It is hoped that the introduction of adult silver salmon of Sandy River stock will help restore the potential of the Upper Sandy River without the cost of artificial rearing. The transplanted silver salmon were obtained from surplus stocks held by the Oregon Fish Commission's Sandy River Hatchery which is located on the lower part of the river near Sandy, Oreg. The advantage of using silver salmon native to the Sandy River for the transplant is that nature has probably already provided the adaptations necessary for the water and temperature conditions in the system.

The silver salmon transplant is another step in the Oregon Fish Commission's program to enhance potential fish production by building fish ladders over barriers, clearing log jams, and transplanting fish from areas of surplus to areas of underproduction. Salmon will, with very little variation, return to their home stream to spawn, generally avoiding nearby tributaries even though they may offer excellent spawning conditions. The pattern of a salmon run can be altered by transplanting adult spawners. The resulting young are reared in a new environment and inherit the inclination to return to their own rearing water even though it is foreign to their parents. Therefore, salmon transplants seem to offer an inexpensive way to increase salmon production, provided natural conditions are favorable. (Oregon Fish Commission, September 29, 1964.)

Pesticides

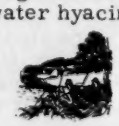
RESPONSIBILITY FOR FIELD SURVEILLANCE ON EFFECTS ON FISH AND WILDLIFE:

Responsibility for field surveillance of pesticide operations to observe possible effects on fish and wildlife has been assigned to the Division of Fishery Management Services, Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior. The program got under way in September 1964, following the delegation of such responsibility to that Bureau by the Secretary of the Interior. An office established by the Bureau at Fort Collins, Colo., to cover its southwest region is headed by a former official of the U.S. Public Health Service whose broad experience in this field of work will enable him to prepare statements of procedure and to assist in training other field employees in pesticide operations.

One of the first field projects in the southwest region was the spraying of lands and waters of the Yuma Proving Ground by the U.S. Air Force to control mosquitoes. The chemical or pesticide used at that time was reported as having no apparent effect on fish and wildlife.

The Bureau's Branch of Fishery Management Services also appointed a "surveillance manager" to cover its Pacific region (Alaska, Hawaii, Montana, Idaho, Washington, Oregon, California, Nevada). Observations will be made and data collected at all major pesticide projects that may have an effect on the fish and wildlife resources in those states.

In its southeast region, the Bureau will participate with the U.S. Corps of Army Engineers in its program for control of aquatic plants such as water hyacinth and alligator weed.



Radiation Preservation

FISHERY PRODUCTS IRRADIATOR AT GLOUCESTER (MASS.) DEDICATED: The Marine Products Development Irradiator dedicated on September 28, 1964, at Gloucester, Mass., is a part of the Atomic Energy Commission (AEC) program for radiation-pasteurization of food. The facility containing the irradiator is located next to the U.S. Bureau of Commercial Fisheries Technological Laboratory, Emerson Avenue, Gloucester, Mass. The fishery products irradiator is to be operated by the U.S. Bureau of Commercial Fisheries, under an agreement with the AEC, to investigate the pasteurization of fishery products.

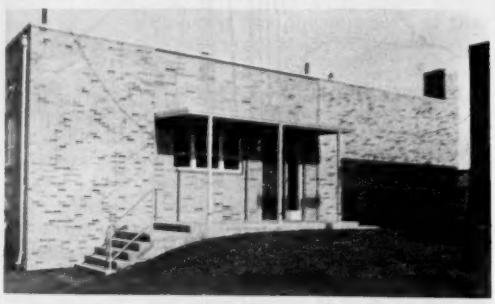


Fig. 1 - Outside view of Marine Products Development Irradiator at Gloucester, Mass.

The Marine Products Development Irradiator is a semiproduction facility with the capability of processing about 1,000 pounds of marine products at a typical pasteurization dose of 500,000 rads. (A rad is a standard unit of measurement of absorbed radiation and may be interpreted, for popular purposes, as "radiation absorbed dose.")

The cobalt-60 source employed within the shielded facility is of approximately 250,000 curies. (A curie is a standard unit of measurement used to describe the intensity of radioactivity in a given amount of radioactive material. One curie equals the radioactivity associated with one gram of radium.)

The Marine Products Development Irradiator building is a rectangular one-story building. It is divided into a general area and an irradiation cell.

The general area of 2,500 square feet includes the lobby, office, laboratory space for health physics and dosimetry, cold-storage room, filleting area, and conveyor loading area.

The irradiation cell has a gross area of 1,250 square feet. It has concrete walls more than 5 feet thick and a 4-foot-thick ceiling which has a removable plug for lowering the 7-ton lead shipping casks containing the radiocobalt into the storage well. Operations within the irradiation cell are controlled and viewed remotely with the aid of television and electrical controls.

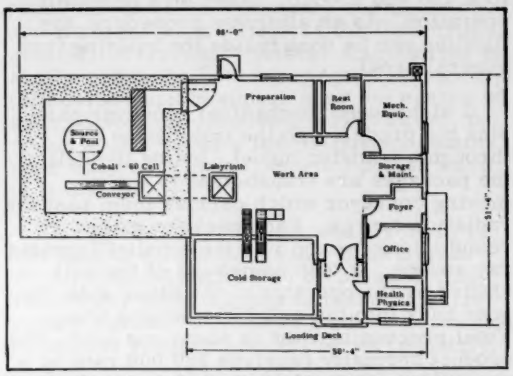


Fig. 2 - Floor plan of Marine Products Development Irradiator.

Source operation: The radiation source is raised by an elevator and is placed in a horizontal position inside an aluminum shroud between the tracks of the conveyor. It is cooled by a stream of air flowing through the shroud. The source plaque is approximately 1 foot by 4 feet and is made up of 6 subunits. When not in use, the source is stored in 15 feet of water in a stainless steel well within the irradiation chamber.

Safe operation: There are a number of safety interlocks in the irradiation cell to prevent accidental exposure of personnel to radiation from the cobalt-60 source. A number of strategically placed openings in the walls and roof can be used to introduce long-handled tools in the event of elevator malfunction. As another safety feature, the irradiation cell is kept at a lower pressure than the rest of the building. Air is drawn from the building into the cell and then is exhausted through a filter stack.

Processing: The pasteurization process can be introduced with little disturbance to commercial fish distribution procedures.

After the fish have been filleted and packed, the packages are sent through the irradiation cell. Fillets of finned fish are handled in rectangular tins holding 30 pounds of product. Shellfish, such as clams, will be packed in commercial No. 10 cans.

In the normal operation of the Marine Production Development Irradiator, the seafood packages will be brought into the building and placed on movable racks in the cold-storage room. The room has a capacity for 1.5 day's supply of incoming irradiated seafood and end product, based on a one-shift operation. As an alternate procedure, the filleting can be done inside the building (see general area).

A high-speed mechanical conveyor carries the product into the irradiation cell through a transfer tunnel. Inside the cell, the packages are transferred to a slow-moving conveyor which carries them past the radiation source. Each package makes a round trip under and over the cobalt-60 gamma ray source. It then comes out of the cell, is shifted by the operator to the other side, then goes back into the cell for a second trip. Total processing time is about one hour. The product normally receives 250,000 rads at a production rate of 2,000 pounds per hour. The dose can be reduced to 150,000 rads or less if desired, by increasing the production speed or by removing one or more of the 6 subsections into which the source is divided.

The AEC radiation-pasteurization program, of which the Marine Products Development Irradiator operation is a part, aims to develop the technology for demonstrating the practical feasibility of using relatively low doses of radiation to extend the shelf-life of selected perishable foods. Present emphasis is on fish and fruit products. In general, those will still require refrigeration, but the shipping and storage life of fish may be extended severalfold, while a significant reduction in fruit losses during transportation and marketing can be achieved. Extension of this technology to final commercial applications would be carried out by private industry.

Wholesomeness and public health safety: Studies are being carried out to determine the wholesomeness, nutritional adequacy, and safety of low-dose irradiated foods which are of interest to the AEC program. The ultimate objective is to evaluate any possible public health questions which might arise from prolonging refrigerated storage life by application of low doses of radiation.

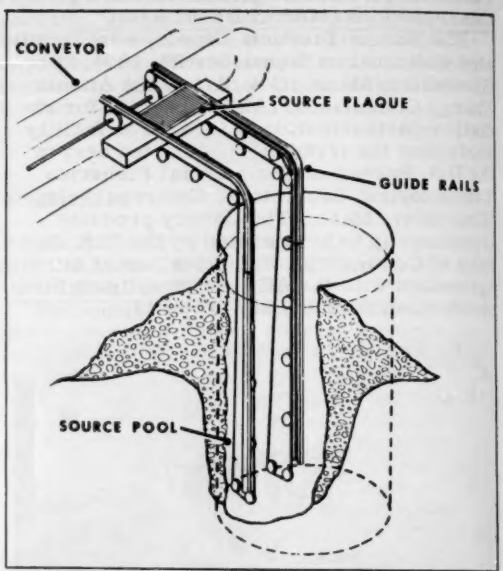


Fig. 3 - When the cobalt-60 source is not in use, it is lowered into a 16-foot stainless steel well containing a pool of water 15 feet deep. The elevator controlling the radioactive source operates not unlike an overhead garage door. The radio-cobalt plaque is in a horizontal position between the upper and lower tracks of the seafood conveyor.

The findings of these studies will be coordinated with results obtained in the Army Material Command's program on radiation-sterilization of food. These data are to be submitted in the form of petition requests to the U.S. Food and Drug Administration (FDA) for approval of low-dose irradiated foods for unlimited human consumption. Petitions for clearance of several types of lean fish--haddock, halibut, flounder, sole, cod, ocean perch, and pollock--are also to be submitted to FDA within 3 or 4 months.

FDA clearance of irradiated products represents only the removal of legal restrictions. Consumer acceptance and the development of radiation facilities are two key factors which require, and are receiving, increased attention. Food irradiation will begin to achieve some significant commercial application in the next few years, judging by current estimates. (United States Atomic Energy Commission, Washington, D.C., September 28, 1964.)

Note: See Commercial Fisheries Review, October 1964 p. 35; September 1964 p. 33.

Salmon

COOPERATIVE UNITED STATES-CANADIAN TAGGING PROGRAM:

A salmon tagging program launched by the Washington State Department of Fisheries is expected to yield information of value to Canada's Department of Fisheries. The program involves coho, chinook, and chum salmon in the vicinity of West Beach, Whidbey Island, and throughout the San Juan Islands area.

Large numbers of the "Petersen" tags used in this program are expected to be recovered in Canadian waters by Canadian fishermen. The Washington State Department of Fisheries has requested the help and cooperation of Canadian fishermen who might find the tags. The project has the support of the Department of Fisheries of Canada.

The recovered tags may be returned to Fishery Officers on the lower mainland at Vancouver Island points, or direct to the headquarters of the Canadian Department of Fisheries at 1155 Robson Street, Vancouver, B.C. Tags collected will be turned over to the Washington State Department of Fisheries. Persons returning a tag will receive a reward of 50 cents plus an additional 50 cents if information as to the time and place of the catch, the species, and other pertinent data are provided.

Sharks

SOUND WAVES OF LOW FREQUENCY MAY GUIDE SHARKS TO FOOD:

A new study indicates that sharks can use underwater sound waves to "home" in on a suspected food source--possibly including human beings--with remarkable speed and accuracy. That follows an earlier discovery that a struggling fish or a threshing swimmer may generate a "dinner bell" sound wave for cruising sharks. Those findings resulted from a continuing study of hearing and related senses in fish being conducted by a scientist at the Institute of Marine Science, University of Miami.

The study, which is supported by the National Science Foundation and the Office of Naval Research, could serve as a basis for understanding the amazing ability of fish to orient themselves in an environment that, to most humans, seems without landmarks.

The sharks tested could detect and locate the source of low-frequency sound waves when cruising over 200 yards from the sound source--far beyond visual range and with no blood in the water for sharks to smell.

Discussing sharks, the scientist in charge of the study said, "like any predatory animal, he preys most upon victims he finds easiest to catch. The easiest of these, other than a dead animal, is a cripple struggling or dying in the water. Our early experiments showed that (1) struggling fish create underwater sound waves of low frequency and these waves are transmitted in bursts as the fish struggles; (2) the frequency of these sound waves is easily within the hearing range of sharks; and (3) sharks rapidly appear near the source of such pulsed low-frequency sound waves, but do not appear when a low-frequency continuous wave or a high-frequency pulsed wave is transmitted."

During the experiments, sharks up to 14 feet long of all the commonly known kinds were repeatedly attracted by broadcasting underwater taped signals of pulsed low-frequency sounds. Predators such as barracuda, jacks, and grouper also appeared regularly.

As a result of his experiments, the University of Miami scientist believes sharks use the lower part of their hearing range, from about $7\frac{1}{2}$ to 100 cycles per second (c.p.s.), for hunting food. It was sound in that frequency range that was broadcast to sharks in experiments in the summer of 1964. It is believed that sharks can hear up to about 400 c.p.s. (The range of human hearing is between about 50 c.p.s. and 20,000 c.p.s.)

"At the outset we were not sure, however, whether sharks could swim directly to the source of the sound or whether they conducted some sort of random or organized hunting pattern that eventually brought them to the right place. The speed with which they appeared seemed to rule both methods out. But it was still a possibility.

"Also, sound transmitted underwater produces near the source an area of sound turbulence often called the 'near field effect.' Physicists have generally believed that fish could only localize a sound if they were swimming inside the turbulent sound area," the director of the shark study said.

Using a light plane to find and track sharks, and a surface vessel to transmit the "dinner call" sound wave, University of Miami inves-

tigators found that sharks were very efficient at locating the source of the sound, even when beyond the near-field effect. The sharks swam rapidly and directly to the sound source, usually staying fairly deep. When they arrived at the vessel, they stopped suddenly, 1 or 2 boat lengths away, and then swam off.

About 20 shark-tracking missions were flown during the study in the summer of 1964.

How sharks can pinpoint the location of a sound source is still not certain. In humans, part of the ability to locate particular sounds is due to the fact that the ears are set far apart. They are external and have external openings. One ear hears a sound slightly before the other one, the mind performs a subconscious problem in triangulation, other information is considered, and the answer is presented.

That process may not work in the case of sharks. The ears of a shark are set inside its cranium and are very close together. That fact, coupled with the high speed of sound waves traveling through water (1 mile per second or 5 times faster than sound in air), suggests that sharks receive all sounds in their ears almost simultaneously. A location solution through triangulation is unlikely.

According to the University of Miami scientist, it seems more probable that sharks are locating the source of a sound through a group of sensitive cells along their sides. That group of cells, called the "lateral line," has been a controversial subject among fish experts for a number of years. It is possible that their function, never certain, is connected with sound reception and orientation.

Laboratory experiments testing that theory are planned. (University of Miami, September 16, 1964.)

Shrimp

SEABED DRIFTERS RELEASED IN PINK SHRIMP MIGRATION STUDY OFF FLORIDA:

Florida fishermen may be finding bright yellow seabed drifters in their pink shrimp catch. The return of those seabed drifters with details on the time and place of capture may help explain one of the mysteries of the sea--how baby pink shrimp move from offshore spawning grounds to inshore nursery waters. Millions of pink shrimp spawn each year near the famous Dry Tortugas shrimp grounds off Florida. The baby pink shrimp presumably find their way by some mysterious means to a vast nursery ground in the Florida Everglades. But how the tiny shrimp reach the nursery, traveling against winds and currents, is a baffling problem.

The planktonic shrimp larvae are capable of only limited independent movement, so they are at the mercy of tides and currents. Do unknown bottom currents exist that sweep the shrimp larvae into the Everglades nursery? In an attempt to answer that question, the Institute of Marine Science, University of Miami, in cooperation with the U.S. Bureau of Commercial Fisheries released 240 seabed drifters during the first week of October 1964 in Florida Bay and in the Gulf of Mexico, north of the Tortugas grounds. The seabed drifters, which are yellow umbrella-shaped objects standing about 15 ininches high, bounce along the bottom after being released, following deep-running currents. It is expected that many of the drifters will be caught in the nets of shrimp trawlers, while others may be snagged and pulled in by fishermen, or washed ashore.

Investigators need accurate information on the location of the area in which each drifter is found, together with the date of its capture. Such information will aid materially in determining the role of currents in the migrations of pink shrimp larvae.

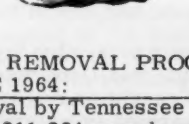
A reward of 50 cents will be paid for each seabed drifter label returned. The reward will be paid by a U.S. Bureau of Commercial Fisheries agent at any port of landing. Labels may also be mailed to the Institute of Marine Science, University of Miami, Miami, Fla. 33149; or to the Galveston Biological Laboratory, U.S. Bureau of Commercial Fisheries, Fort Crockett, Galveston, Tex. Fishermen mailing such labels are urged to include details on the time and place of capture.

* * * * *

UNITED STATES SHRIMP SUPPLY INDICATORS, OCTOBER 1964:

Item and Period	1964	1963	1962	1961	1960
	. . . (1,000 Lbs. Heads-Off) . . .				
Total landings, So. Atl. and Gulf States:					
December	-	9,493	8,615	6,538	7,099
November	-	13,250	12,177	9,996	14,455
October	13,500	22,022	15,254	12,696	21,688
September	15,458	18,045	13,012	9,691	18,832
January-August	68,721	75,444	56,781	52,474	78,961
January-December	-	138,254	105,839	91,395	141,035
Quantity canned, Gulf States 1/:					
December	-	2,175	2,037	816	894
November	-	2,495	3,028	2,175	1,535
October	1,900	4,242	4,054	2,065	2,480
September	1,364	3,697	1,759	598	2,222
January-August	10,056	16,859	12,444	8,846	19,263
January-December	-	29,468	23,322	14,500	26,394
Frozen inventories (as of end of each mo.) 2/:					
December 31	-	45,335	31,577	19,755	40,913
November 30	-	42,142	27,500	20,668	37,264
October 31	-	37,418	21,315	17,811	31,209
September 30	22,909	27,356	12,843	13,361	24,492
August 31	21,952	24,803	12,754	12,728	20,171
July 31	24,315	25,460	13,677	14,849	17,397
June 30	25,546	24,047	13,796	19,416	15,338
Imports 3/:					
December	-	16,296	15,798	15,442	12,411
November	-	14,759	17,964	14,852	13,516
October	-	20,153	18,279	16,813	14,211
September	-	10,236	9,696	8,629	8,190
August	8,501	8,598	7,381	6,743	6,407
January-July	82,330	81,487	72,065	63,803	58,684
January-December	-	151,530	141,103	126,268	113,418
	. . .(¢/lb., 26-30 Count, Heads-Off). . .				
Ex-vessel price, all species, So. Atl. and Gulf Ports:					
December	-	59.6	82.9	75.2	54.2
November	-	52.3	84.5	73.5	54.0
October	4/64-74	53.3	90.0	68.7	53.0
September	4/62-72	57.9	90.9	70.1	52.2
August	4/60-73	59.0	83.6	66.1	52.0
July	64.5	63.5	82.1	55.8	54.6
June	66.0	77.0	84.4	53.7	64.1
May	61.1	80.9	83.7	52.8	62.9
Wholesale price, froz. brown (5-lb. pkg.), Chicago, Ill.:					
December	-	75-82	101-107	91-92	68-70
November	-	71-78	105-110	89-92	69-73
October	83-94	67-75	108-115	83-90	69-73
September	79-83	73-77	113-118	87-90	65-70
August	78-84	75-81	110-112	76-91	64-67
July	80-85	77-97	-	70-75	72-77
June	80-85	95-102	102-104	67-72	76-77
May	72-83	100-103	96-103	67-69	74-77

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 30.3.
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
4/Range in prices at Tampa, Fla.; Morgan City, La., area; Port Isabel and Brownsville, Tex., only.
Note: October 1964 landings and quantity used for canning estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.



Tennessee

ROUGH FISH REMOVAL PROGRAM, APRIL-JUNE 1964:

The removal by Tennessee commercial fishermen of 211,264 pounds of rough fish, including 54,584 pounds of carp, from eight Tennessee reservoirs and the Cumberland River in April-June 1964, was reported by the Tennessee Game and Fish Commission. The largest rough fish harvest during that period was at Kentucky Lake where 177,740 pounds of fish were taken, including 54,584 pounds of carp. Other reservoirs were Watts Bar, Fort Loudoun, Douglas, Cherokee, Chickamauga, Hales Bar, and Old Hickory. A take of 9,663 pounds of fish in the Cumberland River was recorded for the month of June only.

The rough fish removal program in most states is designed as a sport fish management tool for the benefit of the sport fisheries. Theoretically, substantial removal of rough fish should benefit sport fish production in a number of specific ways generally reflective of decreased competition for food supplies.

Tuna

AGE-GROWTH STUDIES OF BLUEFIN TUNA LANDED IN CALIFORNIA:

M/V "West Point" Tuna-Tagging Cruise (August 11-28, 1964): This cruise was the third of a series of annual tuna-tagging cruises to provide information on the age, growth, movements, and vital statistics of the Pacific bluefin tuna (Thunnus thynnus). The chartered research vessel West Point was used for this purpose by the U.S. Bureau of Commercial Fisheries Biological Laboratory, San Diego, Calif., in cooperation with the California Department of Fish and Game. Fish tagged during this cruise were distributed from Ranger Bank near Cedros Island, Baja California, Mexico, to the offshore waters of California.

Specific and more detailed objectives of the cruise included the tagging and release of bluefin tuna, collection of serological materials for subpopulation analysis, length-frequency samples of the individual catches, scale samples, stomach samples, collection of bathythermograph (BT) data relating catch success to thermocline depth and magnitude, and collateral oceanographic and meteorological observations.

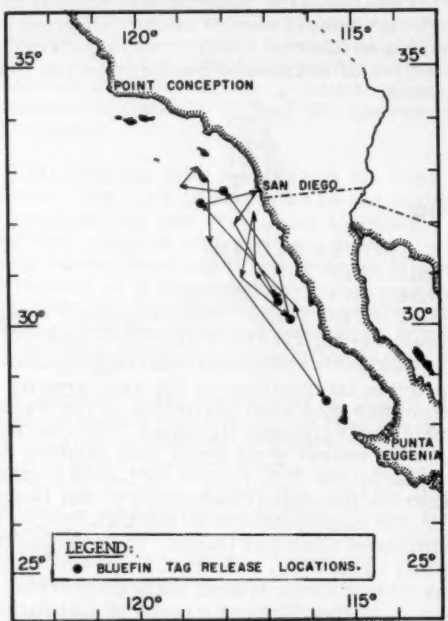
A total of 782 bluefin tuna were tagged and released during the cruise. Blood samples taken from individual bluefin tuna totaled 298 and were shipped to the Bureau's Tuna Sub-

Bluefin Tuna Tag Release Data, M/V West Point Cruise August 11-28, 1964.

Date	Time of Tagging (PDST)		Position		No. of Fish Released
	Start	Finish	Latitude	Longitude	
1964					
August 13	1840	1910	30°30' N.	116°45' W.	96
August 14	0250	0310	30°25' N.	116°45' W.	137
August 17	1640	1655	30°09' N.	116°28' W.	17
August 20	0615	0655	32°41' N.	117°55' W.	247
August 24	1355	1412	28°34' N.	115°42' W.	153
August 27 1/	1020	1040	32°25' N.	118°12' W.	132
Total					782

1/Recovered one tag released August 13, 1964.

population Study group at Honolulu, Hawaii, for serological analyses. Scale samples were obtained from 248 fish.



Cruise track of West Point (August 11-28, 1964) shows bluefin tuna tag release locations.

Supplementary data obtained on the cruise included 15 BT casts at or near the time the purse seine was fished, length-frequency data from all catches, and daily synoptic marine meteorological observations at 0000 and 1800 GMT. Other species taken by the purse seine were: blue shark (Prionace glauca), dolphin (Coryphaena hippurus), and sunfish (Mola mola).

Note: See Commercial Fisheries Review, January 1964 p. 31.

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BLUEFIN TUNA TAGGED OFF MEXICO RECAPTURED NEAR JAPAN:

A bluefin tuna tagged and released 70 miles northeast of Guadalupe Island, Baja California, was caught 22 months later in the Sea of Japan. The tag and complete recovery information was sent to the California Department of Fish and Game by the Japanese Government.

The fish was tagged and released by a joint research team of the California Department of Fish and Game and U.S. Bureau of Commercial Fisheries on August 15, 1962, and was recaptured June 18, 1964, in a trap operated by Japanese fishermen near the coastal town of Fukaura, Honshu.

In the meantime, the bluefin traveled 4,820 miles and grew from 23 pounds to 53 pounds. It was tagged as a one-year old fish and was recovered at the age of three years.

This fish was the first return from Japan of a group of 960 bluefin tuna tagged by State and Federal scientists in 1962 near the coast of southern California and Baja California. Some 168 tags from that group had been turned in by California fishermen.

The first proof that bluefin tuna migrate between California and the Japanese coast came on April 23, 1963, when a tuna tagged off California by the Inter-American Tropical Tuna Commission five years previously was caught by a Japanese long line fisherman. It weighed 35 pounds when tagged and weighed in at 242 pounds (gutted and gilled) when recaptured. (Outdoor California, September 1964.)

Another bluefin tuna, also tagged by biologists of the California Department of Fish and Game, was caught on August 17, 1964, by a Japanese fisherman in waters about 300 miles north of Tokyo. The fish had been tagged and released in Mexican offshore wa-

ters near Guadalupe Island on August 15, 1962, and then weighed about 22 pounds. When it was recovered two years later it weighed 67 pounds and had traveled nearly 10,000 miles. It was the third United States-tagged bluefin tuna caught near Japan.

Note: See Commercial Fisheries Review, August 1963 p. 53.

U. S. Coast Guard

NEW SEARCH AND RESCUE VESSEL "VIGILANT":

The Vigilant, a new search and rescue vessel of the U.S. Coast Guard arrived at its home port of New Bedford, Mass., on October 12, 1964, following a cruise from Houston, Tex., where it was built and commissioned. The Vigilant's mission will be search and rescue off New England. Much of the time, when not on an actual assistance case, the vessel will be assigned to the Provincetown (Mass.) patrol--a search and rescue standby patrol maintained primarily for the safety of United States fishing vessels on George's Bank and for other offshore vessels in that area.

The Vigilant's first search and rescue case began October 5, 1964, only one day after the cutter departed Houston for New Bedford. The Little Creek, a 42-foot fishing vessel with 2 men on board, was foundering in 15-foot seas in the Gulf of Mexico. The Vigilant changed course, raced to the scene, took the distressed vessel in tow, and carried it into Tampa, Fla., on October 6.

The Vigilant, newest search and rescue cutter of the U.S. Coast Guard. The 210-foot vessel has a deck suitable for carrying amphibious helicopters, although none will be carried on routine assignments.

The Vigilant is 210 feet long. It is capable of sustained speed of 18 knots and has a cruising radius of 5,000 miles at 15 knots. It can tow ships of up to 10,000 gross tons. Innovations on the vessel include a helicopter deck and rapid-release boat davits which can put surfboats in the water in 9½ seconds. The surfboats are consturcted of plastic and are gas-turbine powered.

The Vigilant is the third 210-foot medium-endurance cutter to be built in the U.S. Coast Guard's fleet modernization program. The program has scheduled 38 modern search and rescue cutters to be built during the next 10 years. Included in the program will be 350-foot high-endurance cutters, which will be the longest cutters ever built by the Coast Guard. They will be capable of 29 knots and will be highly maneuverable.

United States Fisheries

COMMERCIAL FISHERY LANDINGS, JANUARY-SEPTEMBER 1964:

Total Landings: The U. S. catch of fish and shellfish in 1964 (mostly for the first 9 months and in some instances various periods through October 23) was down about 9 percent as compared with the same period in 1963. Landings were about 301 million pounds less than in 1963--due chiefly to reduced landings of menhaden, Maine herring, Atlantic ocean perch, jack and Pacific mackerel, and shrimp. Landings of industrial fish were down 193 million pounds and food fish down 108 million pounds.

Menhaden: Landings of menhaden to September 30, 1964, totaled 1.3 billion pounds--202 million pounds less than during the same period in 1963. The decline occurred principally in the Middle Atlantic States (down 207 million pounds) and the Gulf States (down 25 million pounds).

Salmon: On the basis of the reported pack of canned salmon, it is estimated that the 1964 catch in Alaska was approximately 312 million pounds--an increase of 89 million pounds or 40 percent compared with 1963.

Tuna: Landings in California to October 17, 1964, were 236 million pounds--down slightly from the 238 million pounds taken during the same period in 1963. The combined catch of albacore, bluefin, and skipjack tuna declined about 19 million pounds, while landings of yellowfin increased by nearly the same amount.

Ocean perch: During the first 9 months of 1964, landings in Massachusetts totaled 26 million pounds (down about 11 million pounds from the previous year); while Maine landings

Modern California tuna purse seiner, the Nautilus. This vessel, a converted Navy mine layer, is 189 feet long.

United States Commercial Fishery Landings of Certain Species for Periods Shown, 1964 and 1963

Species	Period	1/1964	1963	Total 1963
		(1,000 Lbs.)		
Cod:				
Maine	8 mos.	1,900	1,580	1,960
Mass. 2/	9 "	20,600	25,241	31,475
Total cod		22,500	26,821	33,435
Flounder:				
Maine	8 mos.	800	1,005	1,216
Mass.	9 "	68,300	69,315	91,876
Total flounder		69,100	70,320	93,092
Haddock:				
Maine	8 mos.	2,000	1,642	2,878
Mass. 2/	9 "	93,400	88,481	106,075
Total haddock		95,400	90,123	108,953
Halibut: 3/				
Alaska	9 mos.	16,500	21,778	22,372
Wash. & Oreg.	9 "	8,600	11,050	11,871
Total halibut		25,100	32,828	34,243
Herring, Maine	8 mos.	35,700	108,061	152,317
Industrial fish (Me. & Mass.) 4/	9 mos.	24,200	43,341	47,897
Mackerel:				
Jack 5/	9 mos.	58,400	67,054	98,078
Pacific 5/	9 "	18,300	22,722	36,974
Menhaden	9 mos.	1,316,100	1,517,674	1,815,801
Ocean perch:				
Maine	8 mos.	38,500	46,353	63,905
Mass.	9 "	25,900	37,231	44,387
Total ocean perch		64,400	83,584	108,292
Pollock:				
Maine	8 mos.	900	1,934	2,489
Mass. 2/	9 "	6,400	6,450	10,727
Total pollock		7,300	8,384	13,216
Salmon, Alaska	Year	311,800	223,063	223,063
Sardine, Pacific	to Oct. 23	10,500	6,673	7,128
Scallops, sea, New Bedford (meats)	9 mos.	10,300	13,033	15,941
Shrimp (heads-on), So. Atl. & Gulf	9 mos.	133,800	148,648	218,645
Tuna, Calif.	to Oct. 17	235,700	237,994	285,285
Whiting:				
Maine	8 mos.	24,900	15,889	15,942
Mass.	9 "	40,600	53,782	64,571
Total whiting		65,500	69,671	80,513
Total all above items		2,504,100	2,769,994	3,372,873
Other 6/		567,200	602,429	1,467,127
Grand total		3,071,300	3,372,423	4,840,000

1/Preliminary.
2/Landed weight.
3/Dressed weight.
4/Excludes menhaden.
5/Cannery receipts.
6/Includes landings for species not listed.
Note: Finfish generally converted to round weight, crustaceans to weight in the shell, and mollusks reported in meats only.

for the first 8 months of 1964 were 38 million pounds--a decrease of 8 million pounds.

Shrimp: Landings in the South Atlantic and Gulf States declined to 134 million pounds through September 1964 as compared with 149 million pounds during the same 1963 period.

Mackerel: Landings of jack mackerel through September 1964 amounted to 58 million pounds, while landings of Pacific mackerel totaled 18 million--a decline of about 9 and 4 million pounds, respectively, compared with the same period of 1963.

Maine herring: The catch of Maine herring during the first 8 months of 1964 totaled 36 million pounds--a sharp decline from the 108 million pounds in 1963.

U. S. Fishing Vessels

NEW SWORDFISH VESSEL "CHILMARK SWORD" DELIVERED:

In mid-September 1964, the 83-foot steel vessel Chilmark Sword was delivered to her Massachusetts owners by a Rhode Island shipyard. The $150,000 vessel is said to be the first vessel specifically designed for the swordfish long-line fishery. It carries 20 miles of nylon-polypropylene long line. Accessories for the long line include fifty 10-foot poles with radar reflectors, and several hundred rubber buoys.

At the start of fishing operations, the long line is slowly fed out the rear of the Chilmark Sword. At 50-foot intervals the line is crossed with 10-foot secondary lines to which hooks are attached. The hooks are usually baited with mackerel chunks or squid.

The long line is left out for several hours. It is then located with special radar equipment if necessary, and hauled mechanically. The hauling mechanism pulls aboard the vessel the long line, coiling the rope neatly in some 200 galvanized tubs.

Each swordfish taken on the long line is gutted at the edge of the vessel and stored immediately in a plywood-fiberglass hold with a capacity of 50 tons.

Before delivery the vessel was taken on a 12-day trial voyage during which 80 swordfish averaging more than 200 pounds each were caught.

The Chilmark Sword is powered by a 450-horsepower engine. It is equipped with an automatic pilot, and also has controls which allow the skipper to run the vessel from either side of the bridge while hauling in the long line.

The owners of the Chilmark Sword have a similar vessel, the Chilmark Voyager, under construction. (Boston Globe, September 22, 1964.)

* * * * *

DOCUMENTATIONS ISSUED AND CANCELLED:

August 1964: During August 1964, a total of 41 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 62 in August 1963. There were 30 documents cancelled for fishing vessels in August 1964, as compared with 23 in August 1963.

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, August 1964 with Comparisons

Area (Home Port)	August		Jan.-Aug.		Total
	1964	1963	1964	1963	1963
	(Number)				
Issued first documents 2/:					
New England	-	3	24	17	23
Middle Atlantic	1	3	6	15	18
Chesapeake	2	6	26	37	66
South Atlantic	5	7	35	51	77
Gulf	22	35	164	170	239
Pacific	11	7	114	143	160
Great Lakes	-	1	1	4	5
Hawaii	-	-	1	-	-
Puerto Rico	-	-	1	2	2
Total	41	62	372	439	590
Removed from documentation 3/:					
New England	3	5	23	38	48
Middle Atlantic	1	2	11	41	47
Chesapeake	1	1	12	13	25
South Atlantic	4	6	19	43	53
Gulf	11	2	50	78	118
Pacific	9	5	96	65	87
Great Lakes	1	2	7	11	15
Hawaii	-	-	-	1	3
Total	30	23	218	290	396

Note: For explanation of footnotes, see table 4.

Table 2 - U.S. Fishing Vessels--Documents Issued by Vessel Length and Area, August 1964 2/

Length in feet	Middle Atlantic	Chesapeake	South Atlantic	Gulf	Pacific	Total
	(Number)					
29 - 29.9	-	-	1	-	1	2
30 - 30.9	-	-	-	-	1	1
31 - 31.9	-	-	-	1	-	1
32 - 32.9	-	-	-	1	2	3
33 - 33.9	-	1	-	2	-	3
35 - 35.9	-	-	-	2	-	2
36 - 36.9	-	-	-	1	-	1
37 - 37.9	-	-	-	1	2	3
39 - 39.9	-	-	-	2	1	3
40 - 40.9	-	-	-	1	-	1
41 - 41.9	-	-	-	2	2	4
43 - 43.9	-	1	-	-	-	1
45 - 45.9	-	-	-	-	1	1
48 - 48.9	-	-	1	-	-	1
49 - 49.9	-	-	-	-	1	1
50 - 50.9	-	-	1	-	-	1
59 - 59.9	-	-	-	1	-	1
60 - 60.9	1	-	-	-	-	1
61 - 61.9	-	-	1	-	-	1
62 - 62.9	-	-	-	3	-	3
64 - 64.9	-	-	-	1	-	1
65 - 65.9	-	-	-	3	-	3
66 - 66.9	-	-	1	-	-	1
67 - 67.9	-	-	-	1	-	1
Total	1	2	5	22	11	41

Note: For explanation of footnote, see table 4.

Table 3 - U.S. Fishing Vessels--Documents Issued by Tonnage and Area, August 1964 2/

Gross Tonnage	Middle Atlantic	Chesapeake	South Atlantic	Gulf	Pacific	Total
	(Number)					
5 - 9	-	2	1	-	-	3
10 - 19	-	-	-	10	6	16
20 - 29	-	-	-	3	-	3
30 - 39	-	-	2	-	4	6
50 - 59	1	-	-	-	1	2
60 - 69	-	-	1	4	-	5
70 - 79	-	-	-	4	-	4
80 - 89	-	-	1	1	-	2
Total	1	2	5	22	11	41

Note: For explanation of footnote, see table 4.

Table 4 - U.S. Fishing Vessels--Documents Issued by Vessel Horsepower and Area, August 1964 2/

Horse-power	Middle Atlantic	Chesapeake	South Atlantic	Gulf	Pacific	Total
	(Number)					
30 - 39	-	-	-	-	2	2
40	-	-	-	-	1	1
62	-	-	1	-	-	1
80	-	-	-	1	-	1
90 - 99	-	1	-	1	-	2
100 - 109	-	-	-	-	2	2
110 - 119	-	-	-	4	-	4
120 - 129	-	1	-	1	-	2
130	-	-	-	1	-	1
150	1	-	-	-	-	1
160 - 169	-	-	2	3	2	7
170	-	-	-	2	-	2
190	-	-	-	1	-	1
220 - 229	-	-	-	5	2	7
245	-	-	-	-	1	1
300	-	-	-	2	-	2
320	-	-	-	1	-	1
330 - 339	-	-	2	-	1	3
Total	1	2	5	22	11	41

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/There were no redocumented vessels in August 1964 previously removed from the records. Vessels issued first documents as fishing craft were built: 33 in 1964; 2 in 1963; 1 in 1962; and 5 prior to 1946.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

U. S. Foreign Trade

AIRBORNE IMPORTS OF FISHERY PRODUCTS, JANUARY-JUNE 1964:

Airborne fishery imports into the United States in June 1964 were more than double those in the previous month. The increase was due mainly to heavier imports of shrimp from Venezuela and the arrival of volume shipments of live northern lobsters from Canada.

U. S. 1/Airborne Imports of Fishery Products, January-June 1964 with Comparative Data

Product and Origin 2/	1964 June Qty. 3/	1964 June Value 4/	1964 Jan.-June Qty. 3/	1964 Jan.-June Value 4/	1963 Jan.-June Qty. 3/	1963 Jan.-June Value 4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
Fish:						
Mexico	77.6	11.3	228.5	53.2	148.7	45.9
British Honduras	-	-	1.8	0.4	33.9	8.6
Honduras	-	-	-	-	16.5	4.3
Japan	-	-	-	-	2.0	8.2
United Kingdom	-	-	1.9	3.6	1.4	3.6
Iran	-	-	-	-	1.2	7.4
France	-	-	4.3	7.8	0.7	0.6
Rumania	0.9	9.0	0.9	9.0	-	-
Venezuela	-	-	4.6	1.7	-	-
Ireland	0.3	0.3	0.6	0.6	0.8	0.3
Denmark	0.3	0.8	0.6	1.2	-	-
Canada	1.6	0.5	14.8	4.8	-	-
Spain	1.4	1.3	3.2	2.7	-	-
Other countries	-	-	3.2	2.1	-	-
Total fish	82.1	23.2	264.4	87.1	205.2	78.9
Shrimp:						
Guatemala	-	-	-	-	137.7	72.1
El Salvador	-	-	159.1	96.8	198.1	135.9
Honduras	-	-	-	-	22.7	11.9
Nicaragua	24.7	13.6	71.9	41.2	308.7	101.6
Costa Rica	24.6	17.4	188.3	108.1	310.7	150.3
Panama	99.0	60.6	512.1	309.4	882.7	474.2
Venezuela	435.4	217.1	2,162.1	984.1	2,511.2	1,234.9
Ecuador	-	-	-	-	111.6	39.4
France	-	-	-	-	2.6	0.9
British Guiana	-	-	10.5	5.2	-	-
Mexico	-	-	-	-	5.0	1.8
Other countries	0.7	1.0	0.9	1.1	-	-
Total shrimp . . .	584.4	309.7	3,104.9	1,545.9	4,491.0	2,223.0
Shellfish other than shrimp:						
Mexico	-	-	9.0	4.8	73.0	42.6
British Honduras	-	-	82.8	50.4	108.9	78.5
El Salvador	-	-	-	-	5.0	3.6
Honduras	-	-	12.9	9.4	1.9	1.0
Nicaragua	-	-	50.5	40.0	81.0	54.4
Costa Rica	-	-	9.3	9.5	73.8	60.1
Jamaica	-	-	43.6	36.2	51.0	40.1
Netherlands Antilles	-	-	-	-	32.8	20.9
Colombia	-	-	-	-	7.7	21.3
Ecuador	-	-	-	-	2.2	1.8
Tunisia	-	-	-	-	0.8	0.9
British Guiana	-	-	14.5	3.2	1.7	0.3
Canada	206.6	112.1	207.8	113.0	196.6	101.2
Venezuela	-	-	-	-	13.7	6.0
Dominican Republic	0.4	0.4	7.8	1.5	43.5	11.7
Bahamas	-	-	10.6	6.8	-	-
Haiti	0.5	0.5	5.6	3.1	-	-
Other countries	0.1	0.1	0.5	0.6	3.5	3.3
Total shellfish (excl. shrimp)	207.6	113.1	454.9	278.5	667.1	447.7
Grand total	874.1	446.0	3,824.2	1,911.5	5,363.3	2,749.6

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipment is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U. S. import duties, air freight or insurance.
Note: These data are included in the overall import figures for total imports, i.e., these imports are not to be added to other import data published.
Source: United States Airborne General Imports of Merchandise, FT 380, June 1964, U. S. Bureau of the Census.

Total airborne shrimp imports in June 1964 consisted of 559,041 pounds of fresh and frozen raw headless and 25,376 pounds of unclassified shrimp. About 93 percent of the airborne shrimp arrivals in June 1964 entered through the Customs District of Florida. The remainder entered through the Customs Districts of New Orleans (La.), Galveston (Tex.), Los Angeles (Calif.), and New York (N. Y.).

Fish fillets from Mexico accounted for the bulk of the airborne finfish imports in June 1964. The June imports, however, included 900 pounds of caviar from Rumania valued at almost $9,000, which entered through the Customs District of San Francisco (Calif.).

Total airborne fishery imports in January-June 1964 were down 28.7 percent in quantity and 30.5 percent in value from those in the same period of 1963. The decline was due to smaller shipments of shrimp and spiny lobsters from Central and South American countries.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

* * * * *

PROCESSED EDIBLE FISHERY PRODUCTS, AUGUST 1964:

United States imports of processed edible fishery products in August 1964 were up 8.1 percent in quantity and 8.4 percent in value from those in the previous month, due mainly to larger imports of cod fillets, groundfish blocks (increase mainly from Iceland and Greenland), and canned sardines not in oil (increase mainly from the South Africa Republic). The increase was partly offset by smaller imports of haddock fillets, ocean perch fillets, and flounder fillets.

Compared with the same month in 1963, imports in August 1964 were up 2.4 percent in quantity and 4.7 percent in value. This August there were larger imports of canned albacore tuna in brine, canned sardines not in oil, canned lobster, halibut fillets, and yellow pike fillets. But imports were down for groundfish fillets (decline mainly from Canada), swordfish fillets, canned crabmeat, and canned oysters.

In January-August 1964, imports were up 3.6 percent in value from those in January-August 1963, but the quantity of the imports was almost the same for both periods. During January-August 1964, there was a sizable increase in imports of groundfish fillets and blocks (increase mainly from Canada and Iceland), flounder fillets, yellow pike fillets, and sea catfish fillets. But there was a considerable decline in imports of canned tuna, canned crab meat, and swordfish fillets.

U.S. Imports and Exports of Processed Edible Fishery Products, August 1964 with Comparisons

Item	Quantity August	Quantity Jan.-Aug.			Value August		Value Jan.-Aug.	
	1964	1963	1964	1963	1964	1963	1964	1963
	(Millions of Lbs.)				(Millions of $)			
Fish & Shellfish:								
Imports 1/ . . .	52.0	50.8	344.0	342.9	15.5	14.8	103.2	99.6
Exports 2/ . . .	4.5	1.6	28.1	20.0	2.9	0.9	13.3	8.5

1/Includes only those fishery products classified by the U.S. Bureau of Census as "Manufactured foodstuffs." Included are canned, smoked, and salted fishery products. The only fresh and frozen fishery products included are those involving substantial processing, i. e., fish blocks and slabs, fish fillets, and crab meat. Does not include fresh and frozen shrimp, lobsters, scallops, oysters, and whole fish (or fish processed only by removal of heads, viscera, or fins, but not otherwise processed).
2/Excludes fresh and frozen.

Exports of processed edible fish and shellfish from the United States in August 1964 were up 60.7 percent in quantity and 107.1 percent in value from those in the previous month. Heavy August shipments of canned salmon--totaling 2.3 million pounds and going mainly to the United Kingdom--accounted for most of the increase.

Compared with the same month of the previous year, the exports in August 1964 were up 181.3 percent in quantity and 111.1 percent in value. Again, the increase was due mainly to larger shipments of canned salmon. Exports were also up for canned squid (principally to Greece and the Philippines) and canned shrimp (principally to Canada and the United Kingdom). But exports were down for canned mackerel and canned sardines.

Processed fish and shellfish exports in the first 8 months of 1964 were up 40.5 percent in quantity and 56.5 percent in value from those in the same period of 1963. In January-August 1964 there were much larger shipments of canned mackerel, canned salmon, and canned sardines in oil. Exports of canned shrimp were also higher, but exports of canned sardines not in oil and canned squid were down.

Notes: (1) Prior to October 1963, the data shown were included in news articles on "U. S. Imports and Exports of Edible Fishery Products." Before October 1963, data showing "U. S. Imports of Edible Fishery Products" summarized both manufactured and crude products. At present, a monthly summary of U. S. imports of crude or nonprocessed fishery products is not available; therefore, only imports of manufactured or processed edible fishery products are reported above. The above import data are, therefore, not comparable to previous reports of "U. S. Imports of Edible Fishery Products."

The export data shown are comparable to previous data in "U. S. Exports of Edible Fishery Products." The export data in this series of articles have always been limited to manufactured or processed products.

(2) See Commercial Fisheries Review, Nov. 1964 p. 63.

Washington

EXCESSIVE FISHING DAMAGES CHINOOK SALMON RUN IN YAKIMA RIVER:

Almost all of the chinook salmon run to the Yakima River in the fall of 1964 was taken in the nets of Indian fishermen, according to the Director of the Washington State Department of Fisheries. From a run of over 3,000 fish, less than 100 salmon survived to reach the spawning ground. If the surviving spawners reproduce at the same 3-for-1 rate that their parents did, the entire chinook salmon run returning 4 and 5 years from now to the Yakima River from the 1964 spawning will be no more than 300 fish.

There is no doubt that a treaty guarantees the Indians the right to fish and regulate their fishery on their Reservation on the Yakima River. There is also no doubt that the treaty does not guarantee them a healthy run of fish for their harvest. The Yakima Indians have fishing regulations, but their management failed to protect the spawning stock in 1964. The primary purpose of salmon fishing regulations should be to let adequate seed stock get through to the spawning ground.

The Yakima River has a good salmon potential in spite of diverse water use. The Washington State Department of Fisheries has spent considerable sums to rear fish and rehabilitate upstream spawning areas. Other ways to increase the spawning potential are also known, but sufficient salmon must be allowed upstream as a first important step. (Washington State Department of Fisheries, September 28, 1964.)

Wholesale Prices

EDIBLE FISH AND SHELLFISH, OCTOBER 1964:

Prices were generally higher from September to October 1964 and the overall wholesale price index for edible fishery products rose 1.7 percent from the previous month. The more significant price changes in October were principally for haddock and shrimp. At 111.6 percent of the 1957-59 average, the index this October was 4.5 percent higher than in the same month of 1963.

A 3.3-percent increase from September to October in the subgroup index for drawn, dressed, or whole finfish was due largely to higher ex-vessel prices at Boston for large haddock. Because of light haddock landings, October prices were up 22.2 percent from the previous month and were higher than in October 1963 by 30.3 percent. Prices at New York City for fresh and frozen halibut were somewhat higher in October (up 0.9 percent) because of the strong demand for the fresh product. As the seasonal Pacific Northwest halibut fishery came to a close, fresh halibut was in limited supply and much higher-priced than the frozen product. Compared with October 1963, halibut prices this October were 26.3 percent higher. An increase in prices at Chicago for Lake Superior fresh whitefish (up 12.6 percent) this October was offset by lower prices for fresh round yellow pike (dropped 13.7 percent from the previous month). As compared with October 1963, the subgroup index this October was 9.7 percent higher because of the higher halibut prices and sharply higher prices for ex-vessel large haddock.

A modern fish and seafood retail counter in Kansas City, Mo.

The subgroup index for processed fresh fish and shellfish dropped 0.8 percent from September to October because of higher prices at New York City for South Atlantic fresh shrimp (up 1.3 percent). October 1964 prices for other items in the subgroup ranged from slightly to substantially lower than in September, but those lower prices were mostly cancelled out by the more significant (although relatively small) price increase for shrimp. As compared with October 1963, the subgroup index this October was 0.1 percent lower because of lower prices for fresh haddock fillets (down 14.9 percent) and shucked standard oysters (down 6.6 percent), but shrimp prices were up 10 percent from the same month in 1963.

A 4.7-percent increase from the previous month in the October 1964 processed frozen fish and shellfish subgroup index resulted largely from a fairly sharp rise in frozen shrimp prices (wholesale price up 6 cents a pound) at Chicago. Prices this October also were higher for frozen haddock fillets, while

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, October 1964 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			Oct. 1964	Sept. 1964	Oct. 1964	Sept. 1964	Aug. 1964	Oct. 1963
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					111.6	2/109.7	105.4	106.8
Fresh & Frozen Fishery Products:					116.6	2/113.7	106.9	110.0
Drawn, Dressed, or Whole Finfish:					133.4	2/129.1	114.6	121.6
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.17	.14	135.5	110.9	83.3	104.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.56	.55	164.1	2/162.7	122.7	129.9
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.96	.98	134.1	136.2	129.2	132.7
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.54	.48	79.8	70.9	78.3	78.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.48	.55	77.8	90.1	88.4	83.5
Processed, Fresh (Fish & Shellfish):					106.5	107.4	101.1	106.6
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.40	.44	97.1	106.9	86.2	114.1
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.83	.82	96.7	95.5	89.6	87.9
Oysters, shucked, standards	Norfolk	gal.	7.13	7.25	120.1	122.2	118.0	128.6
Processed, Frozen (Fish & Shellfish):					104.7	100.0	100.0	97.5
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.36	.37	91.2	92.5	95.0	100.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.38	.37	109.9	108.5	108.5	114.3
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.30	103.4	103.4	106.9	118.4
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.87	.81	103.2	95.5	94.9	86.0
Canned Fishery Products:					103.1	103.1	103.1	101.7
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	21.75	21.75	94.8	94.8	97.0	102.4
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.56	102.6	102.6	102.6	96.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	6.25	6.25	105.9	105.9	105.9	97.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.00	10.00	128.3	128.3	119.4	113.3

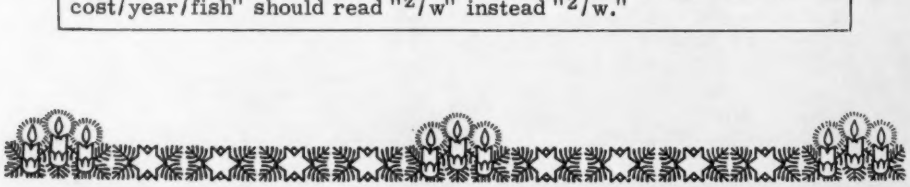
1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.
2/Revised by Bureau of Labor Statistics.

other species of frozen fillets were slightly lower-priced or the same as in the previous month. As compared with October 1963, the subgroup index this October was higher by 7.4 percent. October 1964 frozen shrimp prices were 20 percent higher than in the same month a year earlier but those for all other items in the subgroup were lower than in October 1963.

October 1964 wholesale prices for canned fishery products listed in the index were the same as in the previous month and the subgroup index at 103.1 percent of the 1957-59 average remained unchanged for the third consecutive month. The market for canned fishery products continued to be highlighted by liberal supplies of Alaska canned pink salmon. By contrast, supplies of canned Maine sardines were very low because of the disappointing new season pack which was nearly completed and not expected to total more than about half the 1963 pack. Canned fish prices this October were mostly up from those in October 1963 and the index was higher by 1.4 percent. The only exception was canned salmon (prices 7.4 percent lower than in October 1963).

CORRECTION

In the October 1964 issue, in the article "Comparison of Salmon Catches in Monofilament and Multifilament Gill Nets--Part II," on page 6 in Table 5 under (e), the symbol following "Relative cost/year/fish" should read "z/w" instead "2/w."



International

FISH MEAL

PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-AUGUST 1963-1964:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa. Production and exports of fish meal by FEO countries during January-August 1964 were up substantially from the same period of the previous year. During the first 8 months of 1964, Peru accounted for about 68.1 percent of total fish meal exports reported by FEO countries.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-August 1963-1964

Country	July		August		Jan.-Aug.	
	1964	1963	1964	1963	1964	1963
	(1,000 Metric Tons)					
Chile	16.4	2.1	1/	2.1	2/ 87.0	74.4
Angola	1.9	0.1	1/	1.5	2/ 32.1	16.2
Iceland	13.4	7.6	11.4	5.7	77.8	50.5
Norway	12.0	3.9	12.0	5.4	129.2	50.9
Peru	141.6	110.3	141.6	83.1	1,016.4	807.7
So. Africa (including S.-W. Africa)	20.2	17.9	20.2	15.6	150.2	106.0
Total	205.5	141.9	185.2	113.4	1,492.7	1,105.7

Note: For explanation of footnotes, see table 2.

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-August 1963-1964

Country	July		August		Jan.-Aug.	
	1964	1963	1964	1963	1964	1963
	(1,000 Metric Tons)					
Chile	6.3	25.2	1/	1.2	97.3	72.6
Angola	1.0	1.1	1/	2.0	31.5	16.1
Iceland	20.3	6.3	13.4	18.2	86.6	64.1
Norway	15.0	25.2	15.0	18.3	134.7	88.6
Peru	83.8	39.2	83.8	38.1	1,009.6	778.8
So. Africa (including S.-W. Africa)	30.2	29.2	30.2	19.3	213.1	195.3
Total	156.6	126.2	142.4	97.1	1,572.8	1,215.5

1/Data not available.
2/Data only available for January-July.

* * * * *

WORLD PRODUCTION, JULY-AUGUST 1964:

World fish meal production in July and August 1964 was down somewhat from the average monthly output in the first half of 1964. There was a seasonal decline in output in Peru which is the major producing country. But world production in both July and August 1964 was up substantially from that in the same months of 1963.

World fish meal production in the first 8 months of 1964 was considerably above that in the same period of 1963. The increase was due largely to expanded production in Peru which accounted for about 51 percent of world output during January-August 1964. Higher production during January-August 1964 was also reported in Norway, South Africa, Chile, Iceland, and Angola. The increase was partly offset by lower production in Canada and the United States.

World Fish Meal Production by Countries, January-August 1963-1964

Country	July		August		Jan.-Aug.	
	1964	1963	1964	1963	1964	1963
	(Metric Tons)					
Canada	8,778	5,335	5,999	3,290	36,711	46,535
Denmark	11,703	11,497	16,398	11,024	69,951	69,965
France	1,100	1,100	1,100	1,100	8,800	8,800
German Fed. Republic	5,621	5,632	7,757	6,035	50,655	50,616
Netherlands	1/	600	1/	900	2/3,500	3,500
Spain	1/	1,790	1/	2,075	1/	14,734
Sweden	164	224	581	532	4,411	3,863
United Kingdom	6,985	7,250	5,770	6,065	53,038	52,164
United States	37,792	34,916	28,918	39,068	147,690	3/156,577
Angola	956	1,078	1/	1,954	4/31,498	16,494
Iceland	20,284	6,316	13,389	18,176	86,552	64,060
Norway	15,020	25,255	19,703	18,256	134,558	87,999
Peru	83,798	39,240	56,112	38,098	1,009,592	778,845
So. Afr. (incl. S.W. Afr.)	30,419	30,487	24,480	18,170	218,492	196,654
Belgium	375	375	375	375	3,000	3,000
Chile	6,318	3,565	6,161	1,219	103,459	72,581
Morocco	1/	1/	1/	1/	5/4,060	1/
Total	229,313	174,660	186,743	166,337	1,965,967	1,626,387

1/Data not available.
2/Data available only for Jan.-June 1964
3/Revised.
4/Data available only for Jan.-July 1964.
5/Data available only for Jan.-May 1964.
Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

Most of the principal countries producing fish meal submit data to the Association monthly (see table).

INTERNATIONAL ASSOCIATION OF FISH MEAL MANUFACTURERS

FIFTH ANNUAL CONFERENCE:

The 5th Annual Conference of the International Association of Fish Meal Manufacturers was held in Vienna, Austria, September 29-October 2, 1964. This private organization of associations representing the fish meal industry and individual manufacturing companies was organized in 1959 and has its headquarters in London, England.

International (Contd.):

Some 108 delegates and observers from about 20 countries, representing nearly all of the 17 member countries, together with observers from Japan and Mexico attended the Conference. Other observers were from the Food and Agriculture Organization (FAO), U. S. Bureau of Commercial Fisheries, and the Fish Meal Exporters Organization (FEO).

Scientists were strongly represented in the delegations, all of whom were authorities on fish meal and the fishing industry, either on an international basis or in their own countries. In all, 29 scientists from most of the participating countries met in the Scientific Committee. For the first time, 70 representatives (agents, brokers, and importers) from private industry took part in the opening and closing sessions of the Conference, and part of the General Session.

Among matters discussed at the Conference were production, sales, and consumption of fish meal in 1964 and the estimated production, sales, and consumption for 1965. It was concluded that a stable market for fish meal should continue, and that increases in production and consumption would remain in balance. The fish oil market was reviewed and was also felt to be firm.

The Association will give consideration during the coming year to an economic study of market trends in conjunction with FAO. Various market research and promotional matters also were considered. The Association, while considering commercial matters, in no way deals with price or control of markets, but acts in an advisory capacity.

Scientific matters discussed at the Conference included many topics on the excellent nutritional value of fish meal as a high grade animal protein, with particular reference to increasing its use in more intensive feeding of reared stock, as well as pigs and poultry, its main use at present.

There was a full exchange of information on the work being carried out to hasten the more widespread use of fish flour or fish protein concentrate for human consumption. Particular reference was made to the work being carried out by FAO in conjunction with the Peruvian fish meal industry and Government on a proposed large-scale pilot plant in Peru. Other scientific matters designed to ensure the maintenance of uniform supplies of high grade fish meal in all producing countries were also discussed at the Conference.

During 1965, the Executive Council and Scientific Committee of the Association will hold meetings in London in February or March and in Reykjavik in June or July.
Note: See Commercial Fisheries Review, October 1964 p. 45; January 1964 p. 39.

FIRST NORTH AMERICAN FISHERIES CONFERENCE OF COMMERCIAL FISHING INDUSTRIES

The First North American Fisheries Conference will be held in Washington, D.C., April 30-May 5, 1965. Participants at the Conference will be members of the commercial fishing industries of Canada, Mexico, and the United States as represented by the respective fishery trade associations of the three countries--the Fisheries Council of Canada (Canada); the Camara Nacional de la Industria Pesquera (Mexico); and the National Fisheries Institute (NFI), United States.

The occasion will commemorate the 20th anniversaries of the Fisheries Council of Canada and the National Fisheries Institute, and the 14th anniversary of the Camara Nacional de la Industria Pesquera. The Conference is also in lieu of the 20th annual conventions of the Fisheries Council and NFI, and the 14th annual convention of the Camara.

This occasion will mark the first time in the history of the fishing industry of North America that the commercial fishery trade associations of the three countries have combined for an international meeting, representing all segments of the industry.

While each organization will conduct its own business sessions and committee meetings, the General Sessions will be conducted jointly for the representatives of all three nations. Some of the matters to be discussed at the General Sessions are the resources of the North American continent and the effects of civilization on those resources; modern harvesting and processing; marketing; and the international approach. Papers will be given on those subjects by outstanding world authorities in each of those fields.

FOOD AND AGRICULTURE ORGANIZATION

WORLD FISHERY LANDINGS, 1963:

World fishery catches in 1963 of about 46 million metric tons (live-weight basis) were only about 3 percent greater than in 1962--the smallest increase in five years, according to a preliminary estimate by the Food and Agriculture Organization of the United Nations.

Most of the European countries reported higher fishery landings in 1963. In contrast to 1962, herring were plentiful both in the North Sea and in the Skagerrak and Kattegat, and in addition to those used for reduction purposes considerable quantities were frozen and salted in an effort to relieve the pressure on prices in the fresh fish market. Norway had another poor winter herring season, leading to one of the lowest outputs of kippered herring on record. Both Iceland and Norway landed considerably less Icelandic herring than in 1962. Although brisling for canning was abundant in Norway, high olive oil prices and heavy stocks caused a large part to be diverted to the fish meal industry. The cod fishery was at about the same level in 1963 as the year before in both Iceland and Norway. The United Kingdom's white fish landings in

International (Contd.):

Total Catch (Live Weight) of Fish and Shellfish in Selected Countries, 1959-1963 and 1958-1962 Average

	1/1963	1962	1961	1960	1959	Average 1958-62
	(1,000 Metric Tons)					
World total catch	46,000.0	44,850.0	41,830.0	38,230.0	35,930.0	38,660.0
1962 catch--1,000,000 tons and more:						25,030.3
Peru	6,900.0	6,961.9	5,243.1	3,531.4	2,152.4	3,763.8
Japan	6,697.6	6,863.7	6,710.5	6,192.7	5,884.1	6,231.1
China (Mainland)	2/	2/	2/	2/	5,020.0	4,828.0
U.S.S.R.	2/	3,620.0	3,250.0	3,051.0	2,756.0	3,059.6
United States	2,702.8	2,972.8	2,931.9	2,814.7	2,890.8	2,850.2
Norway	2/	1,338.0	1,509.4	1,543.0	1,575.2	1,480.0
Canada	2/	1,115.1	1,019.6	934.5	1,054.4	1,026.2
South Africa (incl. South-West Africa)	1,132.0	1,062.7	1,010.3	867.6	741.6	867.6
Spain (incl. Ceuta and Melilla)	1,086.0	1,006.0	1,014.5	898.0	855.8	923.8
1962 catch--500,000 tons and more, but less than 1,000,000 tons:						6,788.1
India	2/	973.9	961.0	1,161.4	823.2	996.8
United Kingdom	2/	944.4	902.7	923.8	988.9	951.8
Indonesia	2/	943.0	906.8	756.7	754.1	809.5
Denmark and Faeroe Islands	985.0	928.4	771.0	690.6	760.9	771.1
Iceland	773.6	832.6	710.0	592.8	640.8	671.3
France	2/	672.3	567.7	570.7	555.8	573.5
Chile	762.8	638.6	429.8	339.6	272.6	381.3
Germany, Fed. Rep.	650.3	632.7	618.9	674.0	768.0	687.3
Portugal	2/	518.0	500.7	475.1	427.8	475.4
Philippines	564.9	504.7	475.7	465.5	457.5	470.1
1962 catch--100,000 tons and more, but less than 500,000 tons:						4,860.2
Korea, Rep. of	443.8	467.6	424.5	357.2	392.1	408.9
Brazil	2/	379.4	275.1	251.0	239.1	271.3
Burma	2/	360.0	360.0	360.0	360.0	360.0
Thailand	2/	339.7	305.6	220.9	204.7	253.4
Pakistan	345.0	330.5	319.1	304.5	290.1	305.6
China (Taiwan)	350.7	327.0	312.4	259.1	246.3	274.9
Netherlands	361.0	321.9	346.1	314.7	319.6	323.2
Korea, North	2/	2/	2/	2/	2/	300.0
Sweden	339.8	290.9	267.3	254.3	268.0	263.7
Angola	2/	269.3	241.5	252.0	267.4	261.7
Viet-Nam, Rep. of	332.0	255.0	250.0	240.0	153.5	208.3
Italy	231.6	220.7	239.6	213.3	214.9	219.9
Mexico	2/	218.6	225.4	197.9	192.4	190.6
Malaysia: Malaya	2/	198.4	178.4	167.1	145.9	165.9
Poland	226.7	179.6	185.5	183.9	162.2	171.3
Morocco	178.7	162.9	164.9	154.1	144.4	157.6
Congo (Leopoldville)	2/	2/	2/	2/	153.4	145.0
Cambodia	2/	145.8	2/	2/	2/	145.8
Senegal	2/	133.4	126.9	122.1	99.8	113.6
Germany, Eastern	2/	2/	130.1	114.4	105.6	117.7
United Arab Republic	2/	118.0	92.0	88.5	85.6	92.8
Muscat and Oman	-	-	-	-	-	100.0
1962 catch--50,000 tons and more, but less than 100,000 tons:						852.4
Venezuela	97.2	94.9	83.7	84.7	83.3	85.0
Argentina	124.0	94.1	93.8	101.0	88.7	92.0
Ceylon	92.6	83.9	74.0	57.8	48.3	60.9
Turkey	2/	2/	82.3	89.4	96.7	92.4
Greece	2/	2/	2/	2/	82.0	81.0
Hong Kong	75.1	70.8	63.6	62.3	67.0	66.6
Australia	2/	66.0	61.1	61.0	58.8	60.2
Finland	2/	64.7	67.1	66.0	67.4	65.3
Uganda	69.6	64.5	61.2	62.6	55.6	59.5
Tanganyika	74.0	60.2	60.7	60.0	60.0	59.2
Belgium	2/	59.9	61.7	63.7	57.5	61.4
Aden	55.4	53.8	47.4	22.3	24.4	33.9
Colombia	47.4	51.7	47.5	29.7	21.1	35.0

(Table continued on next page.)

International (Contd.):

Total Catch (Live Weight) of Fish and Shellfish in Selected Countries, 1959-1963 and 1958-1962 Average (Contd.)

	1/ 1963	1962	1961	1960	1959	Average 1958-62
	(1,000 Metric Tons)					
1962 catch--less than 50,000 tons						441.0
Ecuador	52.2	44.5	40.4	44.3	35.9	39.2
Greenland	33.3	43.3	41.8	34.6	33.2	37.0
Ghana	2/	42.4	34.5	31.8	36.0	35.1
New Zealand	2/	41.3	43.1	44.3	41.5	41.9
Cuba	2/	35.9	31.1	31.2	28.2	29.7
Yugoslavia	34.4	30.3	37.3	30.9	29.4	31.9
Ireland	27.6	29.0	32.2	42.8	38.6	36.0
Algeria	2/	2/	2/	25.6	22.5	22.3
Hungary	21.0	21.0	19.3	14.9	14.4	16.5
Sudan	2/	18.6	17.3	16.5	16.2	17.6
Kenya	20.1	18.4	13.5	12.6	22.6	17.8
Ryukyu islands	17.4	17.8	16.0	14.4	21.4	17.2
Israel	17.5	16.4	14.9	13.8	13.2	14.2
Tunisia	2/	2/	2/	16.3	14.8	15.4
Ethiopia	2/	14.0	17.2	19.1	34.7	22.6
Malaysia: Singapore	2/	11.5	9.7	9.2	11.5	10.8
Bulgaria	7.5	9.6	8.1	8.7	6.1	7.7
St. Pierre and Miquelon	2/	8.0	13.6	10.3	9.4	9.9
Rwanda and Burundi	10.6	7.2	5.3	9.2	11.0	8.8
Uruguay	3.4	5.9	8.8	8.0	5.9	6.8
Malta and Gozo	2/	1.3	1.3	1.2	1.1	1.2
Mauritius	1.4	1.2	1.5	1.4	1.3	1.4
1962 catch--less than 50,000 tons						688.0

1/Preliminary.
2/Data not available; estimates used in computing world total catch.
Note: Countries arranged in order of 1962 catch.
Source: Food and Agriculture Organization of the United Nations.

1963 were slightly less than in 1962. Poland's fishery landings increased about 25 percent in 1963.

Fishery landings by the U.S.S.R. reached a total of 4.7 million tons in 1963. This was 200,000 tons more than the planned target of 4.5 million tons, which was already three times the 1948 landings of 1.5 million tons.

The 1963 United States fishery landings dropped about 10 percent in 1963, largely because of lower menhaden landings. The production of groundfish fillets fell by about 10 percent, and of canned fishery products by about 7 percent. The United States pack of Pacific sardines was the smallest in more than 50 years, but the packs of shrimp and oyster from the Gulf of Mexico rose sharply. In Canada, however, the total 1963 fishery landings increased by about 10 percent.

Peru's fishery landings of 6.9 million tons were estimated as only slightly less than in 1962, in spite of a lengthy vessel tie-up of anchoveta fishermen and greater difficulty in finding anchoveta. That species represented 98 percent of the Peruvian landings, which resulted in a new record output of fish meal.

In Chile, the 1963 landings set a new record of 762,800 tons, but results were much below expectations because the anchoveta disappeared almost entirely from the coastal waters off north Chile for six months and a large part of the catches were small fish.

The countries with the largest landings in 1963 (Peru estimated at 6.9 million tons and Japan 6.7 million tons, excluding whales) were slightly below those for the previous year. In 1963 Japan's extended activities in distant-water trawl and tuna fisheries almost offset lower catches in some other Japanese fisheries, including the offshore fisheries and Bering Sea groundfish fisheries. Mainland China with landings roughly estimated at over 5 million tons remained the third largest fishing nation in 1963.

The 1963 landings in South Africa and South-West Africa of 1.1 million tons set a new record for the sixth year in succession. A drop in the Cape catch of shoalfish and a slight decline in trawl fish landings were offset by the very large Walvis Bay pilchard catch of 546,000 tons as compared with 395,000 tons in 1962.

Note: See Commercial Fisheries Review, December 1963 p. 53.

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International (Contd.):

MEETING ON BUSINESS DECISIONS IN FISHERY INDUSTRIES:

Practical applications of fishery research were discussed by fishing industry executives and scientific specialists at the 5-day meeting on Business Decisions in Fishery Industries, which opened September 21, 1964, in Rome, Italy. Sponsored by the Food and Agriculture Organization (FAO) of the United Nations, the meeting was attended by about 100 persons from 35 countries. They included--in addition to the business executives--biologists, naval architects, technologists, and economists interested in fisheries problems. The scientists and technologists reported on progress in fisheries research. The economists then described the tools they have to determine whether the research results can be economically applied.

By exchanging views with scientists, the business executives can learn what the specialists can do to help solve management problems. At the same time, the business executives can indicate what are the most urgent problems on which help is required.

"We believe that improved methods of decision making will lead to improved utilization of fishery resources," the Director of the FAO Fisheries Division said. "This, in turn, will enable man to add to future food supplies and help him in his struggle against hunger."

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INDO-PACIFIC FISHERIES COUNCIL HOLDS 11TH SESSION:

The 11th Session of the Indo-Pacific Fisheries Council (IPFC) of the Food and Agriculture Organization (FAO) was held October 16-31, 1964, at Kuala Lumpur, Malaysia.

The IPFC was established under Agreement signed at Baguio, Philippines, in February 1948. Its functions are to assemble and disseminate technical information relating to water resources of the Indo-Pacific area and to encourage and coordinate research and recommend development programs.

Note: See Commercial Fisheries Review, January 1963 p. 66.

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FORTY-THIRD COUNCIL SESSION CONSIDERS TWO FISHERY ITEMS:

Newly Formed Ad Hoc Committee to Study World Fisheries Development: At the 43rd Session of the Food and Agriculture Organization (FAO) Council, held in Rome, October 13-16, 1964, an Ad Hoc Committee was established to study FAO's role in world fisheries development and how that role might best be reorganized and expanded. In establishing the Ad Hoc Committee, the Council gave consideration to a resolution adopted by the 12th Session of the FAO Conference (biennial) held in 1963, for proposals outlining measures which can be taken to assure that FAO's Fisheries Division is properly recognized as the leading intergovernmental body in encouraging rational harvesting of food from the oceans and inland waters, and is in a position to adequately discharge such leadership. The Conference requested the Director-General to prepare the proposals for consideration by the Council and the 13th Session of the Conference.

The Ad Hoc Committee, initially composed of Chile, France, Iran, Italy, Philippines, Senegal, the United Kingdom, and the United States, is to report and make recommendations to the 44th Session of the FAO Council to be held some time in June 1965. Membership to the Ad Hoc Committee will also be open to other Member Nations which are now, or will be in January 1965, members of the Council and who wish to participate in the Committee's work.

It was the opinion of the Council that international collaboration in fisheries might best be achieved through the establishment of a permanent committee on fisheries of selected Member Nations to deal with those matters and to advise the FAO Conference and the Council, as well as the Director-General, on the formulation, implementation, and coordination of policy and on FAO programs and activities in the fisheries field.

Tuna Resources in Atlantic Ocean: At the 43rd Session the Council also considered the report of its Working Party on the Rational Utilization of the Tuna Resources in the Atlantic Ocean and the comments on that report by Member Nations and various international councils and commissions. The Council agreed with certain conclusions of the Working Party on: (a) problems relating to all the tuna and tuna-like fish inhabiting the entire Atlantic Ocean require urgent attention; (b) that it is necessary to continue and expand programs or research in a number of fields enumerated by the Working Party; and (c) that to this and not only statistics on catches and landings are required but that a detailed and coordinated

International (Contd.):

system of data collection must be put into effect as soon as possible.

Those conclusions were supported, on the whole, by Member Nations and international organizations consulted by the Director-General. A majority of the delegations within the Council favored setting up a new organization to handle Atlantic tuna matters and agreed that a Conference of plenipotentiaries of interested nations should be called to discuss the character, functions, and operations of such an organization and if agreement were reached, to take steps to set it up. The Council came to the conclusion that the matter should be referred to the 13th Session of the Conference for a decision, but requested the Director-General in the meantime to undertake preparatory work including further consultations with Member Nations and interested international organizations so that if the 13th Session of the Conference decided that a Conference of plenipotentiaries should be called, it could meet possibly early in 1966.

Note: See Commercial Fisheries Review, April 1964 p. 43; February 1964 p. 61; January 1964 p. 38.

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NEED FOR SANITARY REGULATIONS IN INTERNATIONAL TRAFFIC IN ANIMALS AND ANIMAL PRODUCTS:

Fishery products were included in discussions at an international meeting held in Berne, Switzerland, October 12-17, 1964, on problems associated with international traffic in animals, animal products, and related items. The meeting was convened jointly by the Food and Agriculture Organization of the United Nations (FAO), the International Office of Epizootics (OIE), and the World Health Organization (WHO).

The meeting was attended by 88 delegates from 40 countries and 12 observers from 8 international organizations. It was the consensus that more uniform and realistic sanitary regulations were urgently needed on a worldwide basis if international trade was to continue to expand to meet the world's growing food needs.

In the discussions on fish and fishery products, the discussion leader reviewed the problems connected with the hygienic inspection of fish and fishery products for human or animal consumption, as well as with international traffic in live fish and fish eggs for breeding, stocking, and ornamental purposes. His observations were based on the work and recommendations of the European Symposium sponsored by OIE held in Turin, Italy, in 1962, on diseases of fish and the sanitary inspection of fresh-water and marine fishery products. Account had also been taken of the work of the OIE Permanent Commission for the Study of Sanitary Regulations on the Importation and Exportation of Animals and Animal Products in this connection. For the purposes of international trade it was felt that standards should be established for organoleptic qualities, packaging, methods of preservation, additives, toxic or radioactive substances, and the detection of diseases transmissible to humans. A number of problems and requirements were mentioned in each case. Particular emphasis was placed on the need for certification and some of the information which certificates should contain was summarized, according to the purpose for which the fish or fishery products were to be used.

Some of the delegates at the meeting felt that there was a danger of duplication in considering those topics at the meeting in session since the Joint FAO/WHO Codex Alimentarius Commission had recently initiated work on most of them. That Commission has assigned to the Fisheries Division of FAO the task of drafting a Code of Principles and coordinating international standards for fish and fishery products. Under the chairmanship of the United States, an Expert Committee has undertaken work on the whole field of food hygiene standards within the framework of the Codex Alimentarius program. Meanwhile, a joint FAO/WHO Expert Committee was dealing with the question of food additives. It was mentioned, furthermore, that the European Inland Fisheries Advisory Commission was studying problems associated with live fish and fish eggs and had held informal discussions on fish diseases. The Organization for Economic Cooperation and Development (OECD) was also reported to be preparing draft standards for certain canned fish products in collaboration with FAO. It was, therefore, suggested that the main working paper should be passed, together with the meetings' observations, to the Joint FAO/WHO Codex Alimentarius Commission and to the European Inland Fisheries Advisory Committee with the added suggestion that the latter Committee's work should be extended to a worldwide basis.

Other delegates pointed out that the veterinary services had an important role to play in

International (Contd.):

these matters. Fish are responsible for the transmission, of several diseases to humans and animals such as Diphyllobothrium infestation, salmonellosis, hepatitis (from shellfish), and botulism. Of particular interest were the dangers of spreading salmonellosis through animal feed containing fish meal, and such new developments as fish farming in which humans, birds, and possibly animals or their excreta come into close contact with live fish, thus favoring new cycles of diseases. Inspection of fish and installations for handling and processing them, it was felt, certainly needed much greater attention, too. It was pointed out that the veterinary authorities in each country should display an increasing interest in control of diseases of fish and prevention of entry of such diseases into their respective countries.

With reference to fish meal it was generally agreed that the industry and trade should be subjected to stricter sanitary controls. Extensive investigations were under way to determine the sources of pathogenic organisms that have been encountered in fish meal. Meanwhile, it was felt that better plant sanitation, especially with respect to handling the end product, would probably be more effective in eliminating contamination than additional sterilization, which is very expensive and might endanger the product's nutritional qualities.

Recommendations made at the meeting were that the necessity for the sanitary control of international traffic in fish and fish products was recognized, and it was therefore recommended that this task be entrusted to appropriate Government services since those products may be the cause of the transmission of infectious and parasitic diseases of man and animals, including fish. The delegates also recommended that OIE and FAO continue their work on this subject and that other international organizations working in this field be invited to collaborate.

At the meeting, a review was made of the work already carried out by the sponsoring organizations, as well as by OECD and the European Common Market.

CODEX ALIMENTARIUS COMMISSION

SECOND SESSION MEETS IN GENEVA:

The Second Session of the Codex Alimentarius (Food Standards) Commission met in Geneva, September 28-October 7, 1964. The Commission is sponsored by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). The joint FAO/WHO program on food standards has as its purpose: (1) simplifying and integrating food standards work now carried on by many international organizations; (2) providing an effective mechanism for obtaining Government acceptance of those standards; and (3) their publication in the Codex Alimentarius. Primary responsibility for the work on food standards rests with FAO, while WHO is concerned with health aspects of the program.

A joint FAO/WHO Conference on Food Standards was held in Geneva, October 1-5, 1962, to establish guidelines for the Codex Alimentarius Commission. The First Session of the Commission was held in Rome, June 25-July 3, 1963.

At the 1964 Geneva meeting of the Second Session of the Codex Alimentarius Commission there were about 125 participants, including delegates from 40 member Governments, observers from 6 nonmember Governments, and representatives from 23 organizations.

Fishery products standards were discussed at the Second Session under agenda items: (1) progress reports of expert committees and (2) re-allocation of preparatory work.

Progress Reports of Expert Committees: Fish and Fish Products: The Commission received a report (Section J. Report of the Committee of Experts on International Standards for Fish and Fishery Products) prepared by the Committee of Independent Experts on Fish and Fishery products (convened by the FAO Fisheries Division). The report was approved and incorporated into the Draft Report of the Second Session of the Codex Alimentarius Commission as follows (subject to minor revisions by the Secretariat of the Commission):

Section J. Report of the Committee of Experts on International Standards for Fish and Fishery Products

> The Codex Alimentarius Commission, at its first session, requested the Director-General of FAO to convene a Committee of Independent Experts on Fish and Fishery Products to prepare for the Commission's consideration (1) recommendations for priorities among fish and fishery products to be standardized, and (2) a draft model standard.

International (Contd.):

The Committee of Experts recommended that the following products be given priority for standardization: canned herring and sardine in tomato sauce; canned herring and sardine in oils; canned tuna, bonito, and mackerel in brine or oils; canned Pacific salmon; and canned crab meat; and canned shrimp; frozen tuna and frozen herring as raw material for further processing; frozen fillets of Atlantic cod, haddock, and ocean perch (Sebastes); frozen Pacific salmon; and frozen crustaceans; cured-salted herring; and salted cod.

The Committee of Experts also drew up a skeleton code of practice for the handling of fish and fishery products as well as a suggested model standard for fishery products. The Experts made certain recommendations concerning the countries which in their opinion would be most likely to have the greatest expertise in the field of standardization of the various fish and fishery products, and requested the Director-General of FAO to approach the Governments of those countries to see whether they would be prepared to undertake this work.

The Codex Alimentarius Commission had a brief progress report on developments since the meeting of the Committee of Experts, informing the Commission (1) that a draft standard on canned bonito in oil had been received by FAO, and (2) that a number of countries had informed the Director-General that they would be prepared to elaborate draft standards on fish and fishery products.

The Codex Alimentarius Commission endorsed in general the procedure outlined in the Report of the Committee of Experts on International Standards for Fish and Fishery Products. The Commission requested that Fisheries Division of FAO should examine the draft standards which were to be submitted by "Author" countries or organizations. The (FAO) officer in charge of the Food Standards Program was instructed to invite all Members of the Commission to indicate which standards were of particular interest to them.

When in the opinion of the (FAO) Fisheries Division experts the draft standards were in a satisfactory form, they would be transmitted to those Members of the Commission which had notified their interest for detailed comments. After a reconsideration of the draft standards in the light of comments received, the officer in charge of the Food Standards Program would send them to all Members of the Commission for comment and the Commission, at its next session, will consider the action to be taken.

Re-allocation of Preparatory Work: The discussion of the future of fisheries standards work was opened by a Canadian delegate who stated that the Codex Alimentarius Commission would eventually need its own Expert Committee on Fish and Fishery Products, but it was not needed now because considerable preliminary work was in progress. The Chairman of the Commission agreed with that view. For the time being, draft standards on fishery products being prepared by various designated countries will be coordinated by the FAO Fisheries Division (in Section J of the Draft Report of the Second Session). Further action on the draft standards will be considered at the next Session of the Codex Alimentarius Commission. The Commission will not attempt to review the draft standards at that time, but will consider the appointment of an expert committee for that purpose. (United States Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, October 14, 1964.)

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WORLDWIDE EXPERT COMMITTEE ON FOOD HYGIENE MEETS IN WASHINGTON:

In connection with work to develop international food standards, the Worldwide Expert Committee on Food Hygiene met in Washington, D. C., May 27-28, 1964. The Committee is one of the working groups of the FAO/WHO Codex Alimentarius (Food Standards) Commission. Food hygiene is included in the program because that element is essential to insure a food standard that is both effective and acceptable.

The Washington meeting of the Committee on Food Hygiene was attended by delegations

International (Contd.):

from Australia, Canada, Israel, the Netherlands, New Zealand, Sweden, Switzerland, the United Kingdom, and the United States.

The agenda adopted by the Committee included:

(1) Recommendations on the scope of food hygiene standards.

(2) Recommendations for guidelines for the development of processing and product inspection standards.

(3) Recommendations for general hygienic standards covering:

(a) disease- or toxin-producing micro-organisms

(b) bacterial indices of pollution

(c) rodent and insect indices of pollution

(d) fungi (mold).

(4) Establishment of priorities.

In handling that agenda, the Committee had before it a United Kingdom draft discussing food hygiene rules. The Committee also received prepared suggestions from the United States on food handling practices. The United States and the United Kingdom agreed to work together on a draft of hygiene standards for fish and fishery products.

The extent of the Hygiene Committee's authority was a major point of discussion during the Washington meeting. It was agreed that the Committee's work would be closely related to that of the various Codex Committees on standards for individual commodities. Whether the Hygiene Committee would work with the individual commodity committees before standards were drafted was left open for clarification by the parent Codex Commission.

Note: See Commercial Fisheries Review, Sept. 1964, p. 1.

INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

ACCOMPLISHMENTS AND OUTLOOK:

International Cooperation: The most notable accomplishment of the International Commission for the Northwest Atlantic Fisheries (ICNAF) since its beginning in 1951 has been the dedication to international fishery conservation and the remarkable cooperation among the scientists and administrators of the different member countries and world conservation agencies in their efforts to maintain the stocks of fish in the Northwest Atlantic at a level permitting a maximum sustained catch.

Collection, Processing, and Publication of Statistical and Biological Data: The Commission early recognized the fundamental need for complete and reliable statistics on the fisheries in the Northwest Atlantic and thus allow its scientists to make the scientific assessments which form the basis for regulating the fisheries in an effort to maintain the maximum sustained catch. Since 1951, ICNAF has concentrated effort on collecting, analyzing, and publishing data on the fish, fish landings, and fishing activity (ICNAF Sampling Yearbook and ICNAF Statistical Bulletin). Cosponsorship with the International Council for the Exploration of the Sea (ICES) and the Food and Agriculture Organization (FAO) of the Expert Meeting on Fishery Statistics in the North Atlantic area in 1959 and of the Continuing Working Party on Fishery Statistics in the North Atlantic area has resulted in standardized statistical requirements and procedures for the whole of the North Atlantic region.

Development of Research Programs, New Ideas and Techniques: The Commission, proceeding on the basis of making sure of the scientific data before embarking on ambitious regulatory measures, drew up an international fisheries research program and stimulated the development of new ideas and techniques for the solution of international and national fisheries-management problems by organizing international scientific symposia on:

(1) "Biological fisheries survey problems and techniques for their solution," at Biarritz, France, in 1956;

(2) "Fishing effort, effects of fishing and selectivity of fishing gear," at Lisbon, Portugal, with ICES and FAO in 1957;

(3) "Redfish (Sebastes) in the North Atlantic," at Copenhagen, Denmark, with ICES, in 1959;

International (Contd.):

(4) "Techniques for fish marking and methods of analyses of recovery data," at Wood Hole, Mass., in 1961;

(5) "Influence of the environment on the distribution and abundance of the major fish stocks of the ICNAF area," at FAO, Rome, in 1964.

All symposia are published in the ICNAF Special Publication series for worldwide distribution.

Regulation by Mesh Size as a Conservation Measure: Based on the success of an experimental 4½-inch mesh size regulation enforced in 1952 in Subarea 5 (Georges Bank) which allowed the small haddock in the declining trawl fishery for haddock to escape in the sizes and quantities recommended by Commission scientists, regulation by mesh size was applied as a conservation measure to other important commercial species in the other subareas. ICNAF mesh-size regulations are now enforced for cod and haddock in Subareas 3 (4-inch), 4 and 5 (4½-inch), and are proposed for all groundfish species in Subareas 1, 2, and 3, excluding redfish (ocean perch) in Divisions 3NOP (4½-inch), and for cod, haddock, and flounder in Subarea 4 (4½-inch).

Assessment of Effect of Mesh Size: Commission scientists pioneered in the development of methods for the assessment of the benefit of saving small fish by regulating mesh size of the nets. In 1962, they reported on the effects of fishing on the stocks of the major commercial species and on assessments of the effect on catches, both immediate and long-term, of changes in the selectivity of gear, in particular, of changes in the mesh-size of trawls. These assessments of the benefit of mesh regulations are reviewed annually and are the basis for recommendations by the Commission for changes in mesh-size regulation to maintain the fish stocks at a level permitting a maximum continuous catch.

Assessment of Effect of Fishing: In 1964, the Commission, from an assessment of the effect of the increasing fishing activity has found that (a) the fishing intensity with which many of the major stocks of cod and haddock are now being fished is near that at which they can provide their greatest sustained catches, and (b) that mesh-size regulations cannot, in themselves, offset the consequences of the continuing build-up in fishing pressure. The Commission, concerned at the implications of those findings, has asked its scientists to continue studies of effects of fishing and to review possible additional conservation measures which might be used to ensure greatest continuous yield from the fish stocks in the Northwest Atlantic.

Assessment of Effect of Environment on Fish: The Commission developed and adopted an environmental program to assess the influence of natural causes on the abundance and distribution of fish stocks and on the success of fishing operations. From April to June 1963, a pioneering survey (NORWESTLANT I-III) studied the drift of cod eggs and larvae and redfish (ocean perch) larvae in relation to their environment in the northern part of the ICNAF area and in the Irminger Sea. The survey involved the coordinated efforts of 8 countries using 11 research vessels. Results are being prepared for publication in the ICNAF Special Publication series. The Commission also completed an international scientific symposium on the environment in relation to the major fish stocks in the North Atlantic at FAO, Rome, in early 1964. Results provided ideas for environmental studies to distinguish between the effects of the environment and effects of fishing on changes in the fish stocks.

Exemptions in Nonregulated Fisheries: In addition to using regulation by mesh size as a conservation measure, the Commission has adopted exemption measures for the protection of the regulated species (cod and haddock) taken in areas where there are substantial fisheries using small-mesh nets for nonregulated species.

Adoption of Principle of International Enforcement: The Commission unanimously agreed to recommend to contracting governments that a system of international enforcement of Commission regulations be set up to eliminate the variability of standards possible under a system of national enforcement.

Acceptance of Responsibility for Seal Conservation: As a result of unanimous agreement in the Commission, the study and recommendation of conservation measures in the declining international fishery for harp and hood seals in the Northwest Atlantic will shortly become an ICNAF responsibility.

International (Contd.):

Outlook for Immediate Future: The outlook for the future is based on the Commission's concern for the rapidly increasing fishing activity in the Convention Area by the 13 member countries and at least 2 nonmember countries on present and new stocks and species of fish. Commission scientists have warned of the consequences and expansion must now give way to rational and controlled exploitation. Regulation of mesh size, although a good conservation measure, has been shown as not completely adequate in controlling exploitation and has raised serious enforcement and practical fishing problems. Additional conservation measures will be sought and problems of early implementation and enforcement will be considered in the immediate future. The Commission will continue to cooperate and exchange ideas with ICES, NEAFC, and FAO with the aim of establishing common benefits for countries fishing in the whole of the North Atlantic. Commission scientists will continue to collect data on the fisheries and to develop new ideas and techniques which will allow them to advise the Commissioners, impartially and objectively, on the effects of fishing and of proposed regulative measures on the stocks and catches. The Commission will continue to look forward to international cooperation and goodwill to the end that all member countries may benefit from the fisheries in the Northwest Atlantic. (ICNAF Newsletter No. 46, Dartmouth, N.S.)

Note: See Commercial Fisheries Review, Dec. 1964 p. Aug. 1964 p. 49; June 1964 p. 35.

INTERNATIONAL CONVENTION FOR THE NORTHWEST ATLANTIC FISHERIES

PROTOCOL AMENDMENT CONCERNING HARP AND HOOD SEALS RATIFIED BY DENMARK AND FRANCE:

Ratifications of a Protocol to the International Convention for the Northwest Atlantic Fisheries of February 8, 1949, relating to harp and hood seals, were deposited by France (July 21, 1964) and Denmark (July 27, 1964). The Protocol, done at Washington, D. C., on July 15, 1963, is intended to bring those species within the responsibility of the Northwest Atlantic Fisheries Commission. The Protocol is not yet in force. (The Department of State Bulletin, August 17, 1964.)

Note: See Commercial Fisheries Review, July 1964 p. 42; March 1964 p. 45.

NORTH PACIFIC FISHERIES CONVENTION

RENEGOTIATION TALKS IN OTTAWA END:

The third meeting of the parties to the International Convention for the High Seas Fisheries of the North Pacific Ocean which began on September 9, 1964, came to a close October 1, 1964, in Ottawa, Canada.

The present Convention and the modifications of this Convention (which were under discussion during the three meetings) have the primary objective of promoting cooperation among the three parties (Canada, Japan, and the United States) in developing and applying effective conservation measures and procedures for North Pacific stocks of fish of common interest.

The earlier meetings, which were held in Washington, D. C., in June 1963 and in Tokyo in September 1963, had provided an opportunity for the delegations from Canada, Japan, and the United States to present and clarify their views concerning revision of the Convention, and the third meeting concentrated on consideration of the principles and details to be included in a revised Convention.

During the course of the meeting the Japanese delegation submitted a draft convention including accompanying protocols which incorporated various modifications of the draft convention discussed at the Tokyo meeting. The new draft took into consideration certain important suggestions made by each delegation at the earlier meetings.

The delegations examined and discussed the new draft convention and protocols and presented constructive modifications for further consideration.

It was generally agreed that the form and content of the articles of the convention under consideration could be made acceptable to the three delegations by means of revisions which were mainly of a drafting nature. However, because of certain problems which could not be be resolved at this time it was not possible to reach full agreement on the salmon and halibut protocols which form an integral part of the Convention.

Throughout the meeting the delegations exchanged views in a frank manner and studied various concrete proposals in efforts to re-

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solve the remaining differences, particularly with regard to the contents of the protocols. As the result of these constructive and conciliatory efforts considerable progress was made, but it was finally decided that complete agreement could not be reached at this time. The delegations therefore concluded that the meeting should adjourn and recommended to the Governments that a fourth meeting be convened at some later date for the purpose of reaching final agreement. In this connection the United States delegation expressed the hope of its Government that the next meeting might be held in the United States at a time and place to be determined by the three Governments.

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA

52ND STATUTORY MEETING HELD IN COPENHAGEN:

The 52nd Statutory Meeting of the International Council for the Exploration of the Sea (ICES) was held in Copenhagen, Denmark, September 27-October 7, 1964. Some 160 delegates and experts from the 16 European Member Countries were in attendance, and others as observers from other countries and international organizations. About 20 committees and working groups considered as many as 150 scientific papers and presented their reports to the Bureau of the Council.

The United States delegation included representatives from the U. S. Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife. Other representatives were from the U. S. National Oceanographic Data Center, the U. S. Naval Oceanographic Office, and the Woods Hole Oceanographic Institution.

The 52nd meeting followed a previous meeting (September 7-12, 1964) convened by the Danish Government to draw up a new constitution with a view to facilitating the implementation of the Council's program. A new Convention for ICES was considered and agreed upon at the previous meeting. The new Convention states, "The Council shall be concerned with the Atlantic Ocean and its adjacent seas and primarily concerned with the North Atlantic." Formerly, ICES confined itself largely to the eastern part of the North Atlantic, primarily off Europe and Iceland.

Among the more important conclusions reached at the Council meeting were:

(1) In view of the extensive exploitation of tuna, sardine, and many other species in the tropical Atlantic, it was decided to develop a research plan and to organize collection of fisheries statistics from the area. Details of the plan, to be known as the "Equatorial Project," are to be drawn up by a Symposium expected to be convened in 1966.

(2) In connection with a request from the Director-General of the Food and Agriculture Organization (FAO) for comments by the Council on the FAO Working Party for the Rational Utilization of the Tuna Resources of the Atlantic Ocean, the Council extended its cooperation to FAO, and to any new organization which might be set up by FAO or by any other international agency for the purpose of organizing and carrying out investigations in the area, aimed at rational exploitation of fish stocks.

(3) Cooperation with the International Commission for the Northwest Atlantic Fisheries (ICNAF) was to be extended and intensified. Joint meetings of scientific experts from both sides of the Atlantic were advocated, preferably independent of the annual meetings of both organizations.

(4) A "Symposium on Arctic Pelagic Fishes" was scheduled to be held in Copenhagen in October 1966. Although most of the species involved are not of great value to mankind, at least not as a food, they are extremely important in the marine food chain and through their effect on the distribution and availability of commercially important fish, such as cod.

(5) During the last three years, ICES Plankton Committee has been working out plans for instituting a review on present plankton research methods, with a view to standardizing them and making the results comparable. Since this work is urgent and of worldwide concern, the Council decided to start on it immediately. There will be four Working Groups to deal with specified items. The United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Special Committee on Oceanic Research (SCOR) are ready to cooperate and to share expenses.

(6) ICES acts as scientific adviser to the North-East Atlantic Fisheries Commission (NEAFC) through a special Liaison Committee. To provide scientific evidence for the benefit

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of NEAFC, working groups were set up to deal with problems concerning, among others, herring in all European waters, cod and other bottom fish, and fishing gear.

In his opening address, the President of ICES drew attention to the misunderstandings and conflicts which may arise from routine scientific samplings and other probings of the seabed and subsoil and of the bottom fauna by means of bottom grabs, dredges, corers, and similar devices. Such actions for purely scientific purposes could be interpreted as exploitation of the Continental Shelf. Wishing to avoid misunderstandings and anxious to insure that research vessels may continue to operate as in the past, the Council is seeking cooperation to insure that the work of research vessels of Member Countries will not be impeded. ICES indicated its readiness, if necessary, to assist in compiling a register of vessels regularly engaged in scientific investigations on behalf of member countries.

A highlight of the Statutory Meeting was a 2-day symposium on the salinity-density-electrical conductivity-relationships of sea water. A new set of tables is to be drawn up by the National Institute of Oceanography in Great Britain and published by UNESCO on behalf of ICES, in order to facilitate international comparison of the readings of electrical salinometers.

The 53rd Annual Meeting of ICES will be held in Rome, Italy, October 4-13, 1965. (Assistant Regional Fisheries Attache for Europe, United States Embassy, October 28, 1964.)

Note: See Commercial Fisheries Review, November 1964 p. 68.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

FISHERY TECHNOLOGISTS MEETING HELD:

A meeting of fishery technologists, sponsored by the Organization for Economic Cooperation and Development (OECD), was held at Op Gouden Wieken, Scheveningen (The Hague), in the Netherlands, September 14-17, 1964.

About 200 technologists from various government agencies, the fishing industry, and research institutions attended the meeting. They were from 19 countries, the Food and Agriculture Organization (FAO), and the European Economic Community (EEC). The OECD Fisheries Committee sponsored the meeting as part of its 1964 work program because the agenda dealt with a number of fishery subjects of direct interest to current or proposed projects of the Committee. Developments in fishery technology have been numerous but fishery technologists had not had an opportunity to attend a meeting of this type since 1956.

The countries and organizations represented at the meeting were: Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Netherlands, Norway, Portugal , Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, FAO, and the EEC. United States representatives were from the Bureau of Commercial Fisheries, National Fisheries Institute, and also the U.S. Fisheries Attache for Europe at Copenhagen, Denmark.

Discussions at the meeting centered on the following major topics which were outlined in a series of 20 background papers:

1. Storage of fish in chilled sea water on fishing vessels (biochemical and engineering aspects).

2. Prepackaging of fresh, frozen, smoked, and other products for retail sale.

3. Handling of wet fish aboard vessels (except in chilled sea water).

4. Handling of wet fish on shore.

5. Problems in freezing, cold storage, and thawing.

Participants at the meeting included many technologists from private industry which led to a useful exchange of views and opinions between them and technologists from government agencies and research institutions. All participants welcomed the opportunity to discuss recent technological developments and hoped that similar meetings could be held more often than in the past.

One of the more significant developments at the meeting was the report by a Portuguese trawler owner that he was successfully supercooling his fish catch to -1° to -3° C. (about 27° to 30° F.) and bringing in the partially frozen fish after 25 to 30 days in a condition which commanded premium prices. The view was held that although contrary to theory, the

International (Contd.):

procedure worked in practice, at least for warm-water fish caught off Africa.

The FAO representative at the meeting convened members of his Experts Committee separately to discuss future technology meetings and related matters. His group suggested that FAO hold meetings each two years, alternating between a technological meeting with substantial participation and a scientific meeting of the symposium type with limited attendance. An FAO technological meeting was suggested for 1966 to consider only two topics--frozen fish and irradiated fish. The latter would include discussions of packaging materials for that product.

A complete report by OECD on the Fishery Technologists Meeting will be issued early in 1965. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, September 30, 1964.)

Note: See Commercial Fisheries Review, July 1964 p. 43.

SALMON

ATLANTIC SALMON FISHERY:

There have been reports for some years of an Atlantic salmon commercial fishery established in the waters off the Greenland coast. The annual salmon catch during 1960-1962 was about 500 metric tons and was caught in gill nets by Danish fishermen. Return of tags indicate that the salmon originate from both the Atlantic coast and from Europe. From the North American side of the Atlantic, most of the tagged fish came from Canada's Maritime rivers, and one was a post-kelt tagged at Cherryfield, Me., which was caught north of the Arctic Circle.

As Greenland's rivers lack spawning facilities, most of the Danish commercial fishery comes from stocks outside the Greenland area. For that reason, Canada's Department of Fisheries and Maine's Atlantic Sea Run Salmon Commission are interested. It is reported that the International Commission for the Northwest Atlantic Fisheries has consented to obtain accurate records on the number of salmon taken in the Danish offshore fishery.

A similar situation is said to prevail in Canada's Newfoundland commercial fishery with much of the stock originating from the rivers of Quebec and the Maritimes, and also the Baltic salmon fished by U.S.S.R., Poland, Finland, and Denmark from stock provided in great part by Sweden's fish hatcheries. (The Atlantic Salmon Journal, June 1964, No. 2.)

EUROPEAN FREE TRADE ASSOCIATION

INDUSTRIAL TARIFFS SCHEDULED FOR FURTHER REDUCTION:

By the end of 1966 the European Free Trade Association (EFTA) will have become a single market of 100 million people almost completely free of tariff and other restrictions in industrial goods traded between EFTA member countries. Tariffs are now at 40 percent of their 1960 level. The remaining tariffs will be eliminated as follows: reductions of 10 percent will take place on December 31, 1964, and December 31, 1965, and a final reduction of 20 percent will be made at the end of 1966.

Note: See Commercial Fisheries Review, April 1964 p. 40; March 1964 p. 35.

Australia

ABALONE INDUSTRY BEING DEVELOPED:

A number of different species of abalone are found around the entire coast of mainland Australia and Tasmania. In some Australian states the abalone is also called "mutton fish." The Technical Research Section of the Fisheries Branch, Australian Department of Primary Industry, has collected considerable information on abalone designed to assist Australian fishermen engaged in that fishery. The abalone fishery in Australia is relatively new and because of the good demand for it in some countries, particularly Asia, the Australian Government conducted research on harvesting, processing, and distribution of the new resource.

The larger species of abalone have the greatest commercial value. Those include the red abalone (Notohaliotis ruber) which inhabit the New South Wales, eastern Victorian, and Tasmanian coasts, and the white abalone (Schismotis laevigata) found on the southern Western Australian, South Australian, Victorian, and Tasmainian coasts. Red abalone grow to a diameter of 6 to 7 inches and the white species up to 6 inches.

An even larger species of abalone (Haliotis laevigata), which grows 9 to 10 inches in diameter, is found on the southwest corner of Western Australia from Albany to Hamelin Bay.

Australia (Contd.):

Smaller abalone species include Haliotis asinina which are about 3- to 4-inches in diameter and are found in Northern Australia, northwest Western Australia, Queensland, and the Pacific Islands, Neohaliotis scalaris (4 inches), common in Western and South Australia, and Emma's abalone (Marinauris emmae), which grows to about 3 inches in diameter and is found in Port Phillip Bay and Western Port bays of Victoria.

Abalone, a mollusk of the gastropod family Haliotidae, cling to reefs, rock, and coral, between low tide level and a depth of about 100 feet, and are gathered by divers. The coast of Tasmania and most of the southern and southeastern coasts of Australia are considered most suitable for the commercial exploitation of abalone. However, nothing is known of the density of abalone populations which may be found in those areas.

Diving Methods for Taking Abalone: In Australia, SCUBA gear and foam rubber suits are used to collect abalone and teams work from anchored boats as opposed to "free" boats favored by so-called "hard hat" divers Australian crews usually consist of two persons--a diver and a diver-tender boat handler--although sometimes a number of divers operate from one tender. Other divers prefer to work alone from an anchored skiff, and even dispense with a surface crew member.

On the east coast of Tasmania, abalone is collected by divers working from fast motor launches. They often work free with a snorkle or SCUBA equipment. A diver can work 6 or 7 hours a day with a snorkle but diving with SCUBA equipment is more exhausting and $3\frac{1}{2}$ hours is the usual limit for diving time. Introduction of new diving equipment is being considered. This consists of a face mask, and a demand valve connected by an air line to a compressor on the surface.

Abalone are pried from rocks with a short, flat iron bar and collected in baskets for dispatch to the surface. Since abalone are highly perishable, they must be delivered to the processor without delay. In colder climates they are fished only during the summer and the operations are very dependent on weather conditions.

On the south coast of New South Wales the price for abalone has been A£65-85 (about US$146 to $190) a ton, depending on size, and divers have landed between half a ton and a ton a day. Prices vary directly with size, small abalone being the lowest priced. Abalone taken off New South Wales weigh about 12 ounces each and average about 3,000 to the ton. But observations by divers there suggest that while there are areas where there are good concentrations of abalone, they are not extensive and would not stand intensive fishing.

Abalone grounds off the States of Tasmania, Victoria, and South Australia appear to provide the best prospects. Processing plants have been set up on the south coast of New South Wales, on the east coast of Tasmania, and on the Mornington Peninsula in Victoria.

Frozen Abalone for Export: Most Australian abalone is frozen whole for export, although some canning is being undertaken, and that section of the abalone industry is the one which is expected to expand further.

At Bicheno, headquarters for the abalone industry in Tasmania, abalone are air-dried for export to Hong Kong and other Asian markets. It takes as long as eight weeks for the abalone to dry, after it is salted and threaded on lines and hung up in a room. The dry abalone are weighed in catties ($1\frac{1}{3}$ pounds) which is the weight used in Hong Kong. It may also be sold in bulk by the picul (133 pounds), the Hong Kong equivalent of a hundredweight. The abalone is packed by color classification and size, gradings being 7-10, 10-12, 12-15, 15-20 pieces per cattie.

Abalone taken on the east coast of Tasmania can be as large as 9 inches in diameter but the average is 5 inches, which is the minimum size of shell allowed to be taken in that State.

There were said to be no forseeable difficulties in freezing and storing abalone for some months. The product should be shelled and the usual precautions taken to prevent desiccation during frozen storage such as glazing and/or wrapping in water-vaporproof film. Storage should be at as low a temperature as possible, preferably lower than -5° F.

Shelled abalone can be stored satisfactorily in the frozen state at about -5° F. for subsequent canning. If the abalone are to be canned immediately, they need not be frozen, but the shelled product should be de-salted or immersed in brine.

Canning Process: The Australian method to can abalone is to place shelled meats layer-

Australia (Contd.):

ed with salt in a suitable container. Use 7 pounds of pure dairy salt to every 100 pounds of meat. Leave a least for 24 hours. Alternatively the meats may be immersed in a salt brine made by adding one pound of salt to 1½ gallons of water and kept immersed for the same period. Scrub the meats with a stiff brush to remove black pigmented skin. Trim base of foot and remove edge of mantle and mouth. De-salt in lukewarm water at 100° F. for two hours.

Pack the prepared meats in suitable size cans and top up with water. Enough salt usually remains in the meat to produce the required salt concentration. Heat exhaust canned product or close under vacuum. Cook in pressure retort according to can size.

To produce abalone steaks the shell is removed and the viscera and dark tough outside fascia are trimmed around the foot muscle. The muscle weighs about one-third of the original live weight of the mollusk. After being trimmed, the meat is washed and sliced across the grain into steaks from ⅜ to ½-inch thick. The steaks are the consistency of a rubber truck tire at this stage and must be tenderized. This is done by pounding them with heavy mallets till they feel velvety. The steaks are then graded according to size and color and packed in 5- and 10-pound cartons and frozen. White abalone meat is considered to be the most desirable and large white steaks bring the best prices.

Drying Process: The abalone are soaked in brine after being removed from the shell. After washing, the salted abalone are cooked for about half an hour in water just below boiling point. They are then spread in shallow trays on drying frames to dry in the sun. Four or five days later the abalone are cooked again for an hour and then smoked for a day with charcoal smoke. They are rinsed in boiling water and finally dried for about six weeks. After rinsing in warm water the dried abalone are ready to prepare for the table.

The drying process causes a loss of weight of about 90 percent. The dried abalone are hard and tough but can be sliced with a sharp knife. The Chinese stew the dried product after soaking it or grind it into a powder and use the pulverized abalone for soup. However, this process probably would be too long and costly, for the Australian abalone industry to compete successfully in foreign markets.

About one-half dozen Australian firms are reported to be handling and processing abalone. (Australian Fisheries Newsletter, June 1964.)

Canada

MARINE OIL INDUSTRY TRENDS, JANUARY-JULY 1964:

Production: Canadian output of marine oils during the first 7 months of 1964 totaled 2,445,000 imperial gallons, a decline of 8.1 percent from that in the same period of 1963. Pacific herring oil production declined in 1964 as did Atlantic groundfish and seal oil production. The decline was partly offset by an increase in Atlantic herring oil production.

Canadian Marine Oil Production, January-July 1964 with Comparisons

Area	January-July		Year		
	1964	1963	1963	1962	1961
	(1,000 Imperial Gallons)				
Atlantic	714	687	1,235	1,160	1,313
Pacific	1,731	1,974	5,713	4,408	1,718
Total	2,445	2,661	6,948	5,568	3,031

Source: Monthly Review of Canadian Fisheries Statistics, July 1964.

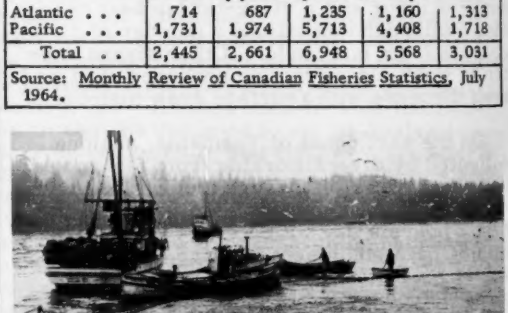

Fig. 1 - Off the British Columbia coast, a Canadian purse-seiner is drawing or pursing the net tighter around a good catch of herring. Canada's west coast herring is principally for making fish meal and oil.

Foreign Trade: Canada, usually a net importer of marine oils, reversed the pattern in the first part of 1964, Canadian marine oil im-

Canada (Contd.):

Fig. 2 - A power winch operates the brailer or large scoop used to transfer the herring from the net to the vessel's fish hold.

ports during January-April 1964 were only 290,000 pounds as compared with 4.0 million pounds in the first 4 months of 1963. Exports, on the other hand, rose from 8.7 million pounds during January-July 1963 to 16.2 million pounds during the same months of 1964. The sharp increase resulted from increased herring oil exports. Those totaled 10.2 million pounds in January-July 1964 (6.4 million pounds to the United Kingdom and 3.8 million pounds to the United States). In the same period of 1963, herring oil exports totaled only 34,000 pounds, all of which went to the United States. Cod-liver oil exports during January-July 1964 totaled 4.6 million pounds of whicn 4.3 million pounds went to the United States. Last year, during the same period, 8.1 million pounds of cod-liver oil were exported, including 7.4 million pounds to the United States. (United States Embassy, Ottawa, October 9, 1964.)

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RESEARCH HIGHLIGHTS AND RESULTS DISCUSSED AT 19TH ANNUAL MEETING:

The research work conducted by scientists of Canada's Fisheries Research Board consists of about 70 percent biology, 20 percent technological research, and about 10 percent oceanography. Canadian scientists on the Fisheries Research Board are active participants in the work of most of the international fisheries commissions on which Canada has membership.

At the 19th annual meeting of the Fisheries Council of Canada held this past April at Charlottetown, Prince Edward Island, the Assistant Chairman of the Fisheries Research Board of Canada gave a report on highlights of recent research results. The text of his presentation titled "Research Ready for Application," follows:

"Oceanography: Until fairly recently, the major responsibility for Canadian research in oceanography was assumed by the Fisheries Research Board. During the past decade a much larger and still rapidly-growing Canadian program in oceanography has developed which is shared by various agencies and coordinated by a Canadian Committee on Oceanography. The Marine Sciences Branch of the Department of Mines and Technical Surveys is taking on the lion's share of oceanographic work in the physical sciences and, as a result, the Board is gradually diverting some of its oceanographic energy from survey and monitoring responsibilities to biological oceanography. Indications of the benefits accruing to the fishing industry from this overall expansion are already apparent:

"1. The first of a series of fishermen's charts of Atlantic fishing grounds will be released by June of this year.

"2. An Oceanographic Information Service, similar in some respects to the Meteorological Service, is developing on both coasts. You can now receive weekly charts of weather, sea state and swell, ice conditions, surface temperatures, vertical temperature profiles, and forecasts of changes in the marine climate. With a Seafax recorder you can obtain most of this information on a daily basis at sea. This Information Service is already used by whale, seal, and tuna fishermen and it is expected that industry will soon be well aware of the increased efficiency which is possible by making much more extensive use of this Service. Forecasting the timing and direction of approach of British Columbia salmon runs is becoming more imminent with our increasing understanding of Pacific oceanography.

"3. Oceanographers are also providing information on long-term temperature changes in our marine climate which, in turn, have important effects on our fisheries. The warming trend of the late 40's and early 50's in the West Atlantic resulted in increased catches of southern species. The current trend to a cooler Atlantic environment is associated with relatively more cold-water fish in landings. These environmental effects on a few of our largest fisheries were recently reviewed by scientists of the International Commission for the Northwest Atlantic Fisheries (ICNAF), and the accumulated information will be published by that Commission. Fluctuations in marine climate with associated effects on resources have also been observed in the eastern Pacific.

"Biological Research: In the biological field, you are particularly interested in the status of resources. You are concerned with forecasts of the abundance of the main stocks now cropped by industry, and you need information on opportunities for expansion. For convenience, I will summarize the situation, as we see it, moving from east to west across Canada:

"Off Labrador, the Canadian cod fishery has declined during the first half of this century from big

Canada (Contd.):

business to a relatively low level. However, the recent development of a large international trawler fishery off Labrador has been accompanied by a growing Canadian interest in the potential for renewed Canadian exploitation of these resources. A year ago this month the A. T. Cameron had 100 European trawlers within a ten-mile radar range fishing cod. This was some 200 miles offshore on Hamilton Inlet Bank, where the cod were at depths of 120 to 180 fathoms. By autumn, cod were still abundant, but in shoaler water. There are several good year-classes of young cod in the Labrador area, and it is expected that large commercial catches will be taken there during the next few years. Large catches of redfish, grey sole and shrimp are also available in deep water off Labrador.

"The new gill-net fishery for cod in Newfoundland is still very profitable, but rather insecure since it is based on stocks of large, old fish. The general rule for fisheries is that intensive exploitation reduces fish sizes and availability. Average catch per net at Trepassey, one of the key gill-net areas, decreased from 770 pounds in 1961 to 660 pounds in 1962 and 510 pounds in 1963. The cod resource along the east coast of Newfoundland is intensively fished by Canada and several European countries. Large Canadian trawlers might be well advised to exploit deep-water concentrations of Newfoundland cod during late winter and spring months, but this would probably not produce any large increase in total landings of inshore and offshore Newfoundland cod.

"The appearance of occasional big year-classes of haddock in the Newfoundland area has resulted in a valuable but very unstable haddock fishery. The last large year-classes of 1955 and 1956 were cropped quickly by the international trawler fleet. Haddock catches have been reduced to a very low level, and surveys give no indication of good recruitment to revive this fishery during the next few years.

"Large stocks of small ocean perch (redfish) and plaice flounders are available as alternate resources for trawlers. Herring and capelin might also be taken in large quantities if marketing problems can be resolved.

"It is worth noting here that we are very much interested in experimental introductions of new species. This fall, we will be looking for returns from the 1962 transplant of 2½ million pink salmon eggs to southeastern Newfoundland. An appreciably larger transplant is planned for this autumn.

"The fisheries of Nova Scotia and southern New Brunswick should continue to expand. Year-round access to a large variety of fast-growing species offers assurance of healthy fisheries. In Nova Scotia, industry has been shifting attention from the northeast to the southwest for haddock, scallops, swordfish, and tuna, and this trend is expected to continue. Good recruitment of year-classes will maintain the haddock fishery; scallop landings are levelling off but they should continue to be high in 1964 if prices are good enough to sustain high effort; increased landings of porbeagle sharks, tunas and skipjacks are expected. Canadian fishermen will eventually follow the lead of the United States and U.S.S.R. and use small-mesh otter trawls to catch small species such as herring, whiting, and 'argentines'.

"The resources of the Gulf of St. Lawrence are being intensively fished by fishermen from 5 Atlantic Provinces and about 5 other countries. Our studies of cod in the southwestern Gulf of St. Lawrence show that this stock is fished as intensively as any known cod stock. The average fish size has been greatly reduced and the catch-per-unit of effort has decreased. We believe that increased effort will not appreciably increase the total catch. We expect that dragger operations will be maintained by fishing for a longer season outside the Gulf and by shifting good-weather effort to the northeastern half of the Gulf where cod, a few new year-classes of ocean perch, and a deep-water concentration of small shrimps are available to industry.

"Lobsters are very intensively fished. In the southern Gulf, the fishery now takes as much as 90 percent of the marketable stock, and this heavy fishing has reduced the proportion of large lobsters to only 3 percent in Northumberland Strait. No major increase in landings is possible, but profits could be increased by greatly reducing fishing effort. Costs of handling and shipping can also be reduced, and a bulletin for your guidance on this subject is in press.

"Oyster rehabilitation is proceeding satisfactorily, except at Shippegan, and current development of oyster hatchery operations should lead to increased production.

"Catches of Atlantic grilse salmon improved in 1963, but the hazards of forest spraying, mine pollution, and commercial exploitation as far away as Greenland do not offer much hope for further increases in the Canadian catch of Gulf salmon.

"In the Great Lakes area we have been carrying out the Canadian share of an international experiment to assess the possibilities of controlling sea lampreys, and thereby build up lake trout production to former levels. After eight years the lamprey population of Lake Superior has been reduced by about 80 percent through use of chemicals, and the trout are showing some signs of recovery. The big question yet to be examined is the relation of high control costs to benefits.

"In the Prairies we have followed up on our experiment in biological control of the Triaenophorus cysts which restrict exports of whitefish and lake herring. In a small lake, the life cycle was broken by intensively fishing pike down to sizes which were too small to eat infected fish. The pike have completely recovered and the cysts have not reappeared. A pilot-plant experiment on a commercial lake now appears to be in order.

"In the Prairies and Northwest Territories we think that a much greater production of whitefish and lake trout can be taken. We hope to carry out an experiment with the provinces to test this hypothesis. Initially it is proposed that quotas on a few commercial whitefish lakes will be deliberately changed to see what happens. Industry cooperation will be needed if this commercial experiment is to be effective.

"The Arctic offers a very limited production of arctic char, lake trout, whitefish, lake herring, western sea herring, and a few species of marine mammals. Native fishermen, of course, have priority in the exploitation of those species.

Canada (Contd.):

"In British Columbia immediate prospects for high landings of presently exploited species are not very bright, but the long-term picture is encouraging.

"The 1964 runs of salmon to the Fraser and Skeena Rivers are expected to offer little surplus over numbers required for spawning escapement. However, if management and increased fish-culture operations are carried out, the long-term prospects for increased salmon production are good.

"The halibut resource is fully used. Quotas for 1964 have been reduced in Area 2, and no long-term increase in landings can be expected.

"The cod fishery depends on 1 or 2 age groups and as a result it is rather unstable. Catches are expected to continue to improve in 1964. Petrale sole landings should also be higher this year. Southern groundfish resources are almost fully used, but ocean perch, other rockfishes, and shrimp offer possibilities for increased trawler landings from the Gulf of Alaska. Fisheries for tuna, saury and pomfret could be developed.

"The large herring fishery should become more valuable if herring can be used more for human food.

"Inshore fishing for invertebrates will gradually increase. Greater crops of butter clams, razor clams, small abalone, and oysters can be taken. Oyster production will be high again in 1964 as a result of the tremendous natural seeding in 1958; but a decline is expected in a year or two, which will only be remedied by returning to farming procedures.

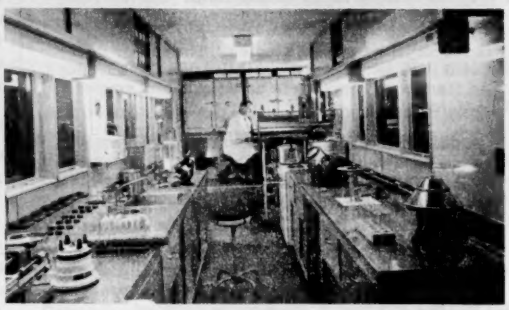
"In summary, although many of our fisheries resources are fully used, we still have many opportunities for wiser use of the stocks now fished and for development of new fisheries to meet the ever-increasing demand for higher landings. Production from North American waters is still low compared with the northwest Pacific or the Northeast Atlantic, where large human populations make heavy demands on marine production for food. You can be optimistic about the availability of resources for continued expansion of Canadian fisheries.

"Our research programs are partly designed to provide increasingly useful predictions to meet your requirements for resource information.

"Technological Research: ...Our most important problem in marketing of fishery products is quality-control. Long-term programs have defined the conditions necessary to minimize physical and chemical deterioration of fish after capture. The importance of rapid cooling, proper handling, low-temperature storage and shipping conditions, and high sanitary standards are well know and application of this knowledge is gradually being put into effect.

"We are now devoting a considerable amount of attention to effects of conditions and activities of fish prior to capture on the quality of fisheries products. Fish processors have long recognized that sea-fresh fish are not necessarily top quality fish. Our work in this field is defining and forecasting variations in quality of fish at capture, and exploring means of avoiding or treating low quality fish.

"Spent fish are soft, and slow recovery from this condition results in jelly fillets and summer 'drip' as high as 15 percent. Since fish are commonly concentrated at spawning time, landings are sometimes highest when sea-fresh quality is not at its best.



A Canadian mobile laboratory (mounted on a truck-trailer assembly) used for technological studies. Shows central work area with various items of equipment.

"Diet of fish has important effects on their odors and flavors. The 'Blackberry' condition found in inshore Labrador cod is an important case in point. The pteropod in cod food produces a very objectionable dimethyl sulphide odor in the affected fish. We are exploring possibilities of treating the fillets. A similar situation, though less severe, has been noted in the fuel-oil odor which has been observed at times in canned chum salmon. The iodine or muddy flavor occasionally found in flounders is also attributed to feeding conditions prior to capture. Such problems are exaggerated by holding noneviscerated fish for processing.

"If fish are left dead in gill nets they will deteriorate very rapidly, particularly at summer water temperatures. Studies of this type of quality deterioration demonstrate the importance of frequent gear lifts, and rapid cooling of fish by gill netters.

"We are learning that freezing of cod in prerigor condition produces mealy meat. This is a problem to be faced in freezing otter-trawl or trap-caught cod immediately after capture. Work is continuing on the advantages of freezing fish in rigor.

"The Board has pioneered in the development of antibiotics to inhibit bacterial spoilage. Two bulletins are available describing how they can be properly used. Tetracycline antibiotics are used effectively on the Atlantic coast, and intelligent application elsewhere is desirable.

"Low concentrations of polyphosphates appear to have some advantages over brine dips in maintaining texture, retarding oxidative rancidity, and reducing thaw 'drip'. However, commercial tests have not been consistent, and we have reservations about application by industry. Use is legal in the United States but not in Canada.

"There is a good deal of interest in the possible use of Cobalt-60 irradiation pasteurization to extend shelf life of fish. Low doses, 75,000 rads, double the shelf life of iced scallops and haddock fillets, from about 12 to 25 days. Heavier doses increase shelf life still further, but they also produce undesirable tastes and odors.

Canada (Contd.):

Use of irradiation is still expensive and controversial, but approval of its use by the United States Army for bacon, and the construction of a commercial test unit for fish at Gloucester indicates that you should keep your eyes on developments in this field. Our current irradiation studies are on lobster meat.

"Freeze-drying is being studied. The major problem is still with texture, but potential use for shredded or cubed fish in such products as dehydrated soups is worth watching.

"High quality fish-protein concentrates has been produced by the Board, and samples are being tested by several firms interested in high protein additives to foods, but to date application has not gone beyond the pilot-plant stage in Canada.

"Research on fish oils is demonstrating their usefulness for food products, detergents, and additives to lubricating oils. Canada imported 50 million pounds of oils in 1962 and this might well be reduced. A Board process for converting fish oils to methyl esters is now being used by a United States firm for processing menhaden oil. It is quite suitable for a large-scale Canadian herring reduction operation.

"We will soon have a bulletin available on specialty products which can be produced from some of our underexploited fresh-water fishes. Fish sausages and wieners, or canned and smoked products, can be made to meet market demands. Competition with smoked meat, and specialty fish products from overseas, appears to be blocking application in Canada.

"A current Board project shows that vacuum canning facilitates removal of water from such products as herring, and undesirable volatile components are readily drawn off. An added advantage is that the more rapid cooling during precooking shortens processing time.

"Finally, I should mention the recent distribution to industry of our circular on botulism. It is hoped that the document will serve to place this problem in its proper perspective, and allay some of the fears recently associated with marketing of fresh-water fish.

"Future Communication: I would like to conclude with three specific proposals for improved Canada-first research-industry communication:

"Firstly, the Information Service of the Department of Fisheries might employ an officer who would spend his full-time writing up research results in language and format which are more attractive to industry than the dry jargon of scientists.

"Secondly, the Board might employ a senior technological research scientist in each major area of the country with the full-time assignment of rapid authoritative communication of research results to industry, and industry problems to scientists.

"And Thirdly, the Fisheries Council might give consideration to action required by industry if it is to keep well informed concerning the increasingly voluminous research information which can be applied." (Bulletin of the Fisheries Council of Canada, Ottawa, September 1964.)

* * * * *

SALMON AND TROUT RESTOCKING PROGRAM IN QUEBEC:

The four fish hatcheries of the Department of Tourism, Fish and Game, Province of Quebec, have been grouped under one administration to intensify the restocking program of Quebec's lakes and streams, in an effort to improve fishing conditions. That section of the Wildlife Branch is now called the Restocking Division, and the four stations at Saint-Faustin, Tadoussac, Gaspé, and the Eastern Townships are charged with the responsibility of improving and increasing the fishing stock in all parts of the Province.

Another phase of the work is selling of part of the yearly production of eggs to private hatcheries. Eight species of fish are bred: speckled trout, brown trout, rainbow trout, lake trout, and moulac (splake) trout; salmon, ouananiche, and maskinonge. The speckled trout alone comprise 63 percent of the gross production, salmon about 27 percent, and the other species a little more than 10 percent.

In 1962 and 63, the Restocking Division of the Department sold 3,469,000 speckled trout eggs, 112,500 lake trout eggs, and 139,000 salmon eggs. Some 700,000 Atlantic salmon eggs have been exchanged with or given to foreign countries. Early in 1964, the Minister of Tourism, Fish and Game, offered in the name of the Province of Quebec, a gift of 50,000 salmon eggs to the Fédération départmentale des Associations Françaises de Pêche et de Pisciculture des Côtes-du-Nord. The French Federation received the eggs in a very healthy condition and they were planted in the rivers of Britanny, close to Saint-Malo.

There is a large demand in Europe and the United States for Atlantic salmon eggs and the Canadian Restocking Division exchanges them for brown and rainbow trout eggs. (The Atlantic Salmon Journal, June 1964, No. 2.)

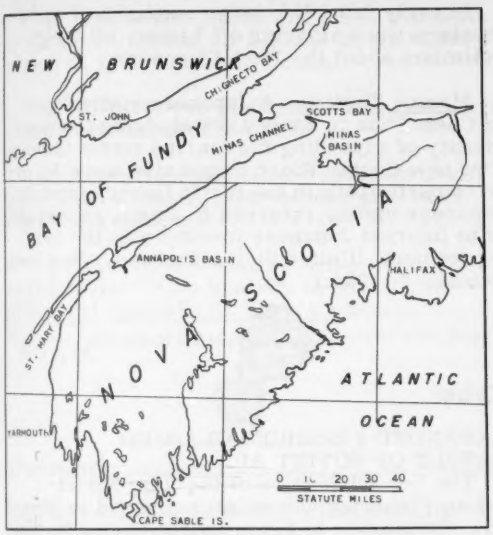
* * * * *

SECTION OF BAY OF FUNDY REOPENED TO HERRING SEINERS:

A large section of the New Brunswick side of the Bay of Fundy, which had been closed to herring seiners during the summer months and was to have remained closed until November 15, 1964, has been reopened for those operations, announced the Canadian Fisheries Minister on October 8. The area concerned lies in a northwesterly direction from a line

Canada (Contd.):

connecting Split Rock, in Saint John County, to Gannet Rock Light, which is south of Grand Manan Island in Charlotte County, but does not include Passamaquoddy Bay, north of Campobello and Bliss Islands. This smaller area is permanently closed to herring seiners.



The Fisheries Minister stated that full analysis had been given to the situation and that the decision to reopen the area at an earlier date had been made after complete consideration of all factors involved. (Canadian Department of Fisheries, Ottawa, October 8, 1964.)

Ceylon

YUGOSLAV-BUILT FISHING TRAWLER DELIVERED:

The first of 5 Yugoslav-built fishing trawlers was delivered this past fall to Ceylon. The trawlers, which reportedly will cost about US$210,000 each were the subject of a Ceylonese-Yugoslav long-term loan agreement signed in September 1962. The delivery dates of the remaining four trawlers was not known. (United States Embassy, Colombo, October 2, 1964.)

Note: See Commercial Fisheries Review, August 1962 p. 58.

Chile

NEW FISH MEAL FACTORY PLANNED:

A new $1.5 million fish meal plant in Iquique is planned by a Chilean manufacturing company which has previously concentrated on paper and pulp interests. The Chilean firm is reported to have received an offer from a Danish company to provide equipment for the new plant under the following terms: 15 percent down with the balance payable in semiannual installments over the 5-year period following shipment of plant materials and equipment. No bank guarantee would be required. A German firm is said to have made a similar offer. (United States Embassy, Santiago, September 22, 1964.)

Congo-Brazzaville

FISHERIES EXPANSION BEING CONSIDERED:

The commercial fishing and fish marketing activity of Congo-Brazzaville is centered at that country's seaport city of Pointe-Noire. There are two fish-freezing-canning plants in the city, one of which is financed by a United States tuna-packing firm in association with two French companies. The United States-French combine operates a 14,000-ton tuna freezing and temporary cold-storage plant. Another separate firm (French) cans tuna and pilchard.

The Congo-Brazzaville total fish catch in 1963 amounted to 7,694 metric tons. Sardines are caught off its coast, as well as tuna and pilchard.

It appears that Pointe-Noire is thought in some quarters to be a suitable site for additional fishing and canning facilities and the Congo-Brazzaville Government has emphasized the need for further economic expansion in that area. (United States Embassy, Brazzaville, October 2, 1964.)

Costa Rica

FISHERIES TRENDS,
THIRD QUARTER 1964:

Pacific Shrimp Fishery: A leading Costa Rican shrimp firm, based at Puntarenas on the west coast, has increased its shrimp fleet to 10 vessels. The firm also buys shrimp at auction from several independent vessels. The company (which has the participation of a United States investor) exports frozen shrimp to the United States, mainly through Miami, Fla. The firm recently received a 6-ton shipment of semiautomatic grading and processing equipment, and is also installing increased refrigeration facilities in its plant on the Puntarenas Estuary.

Pier at Puntarenas, Costa Rica.

Two other shrimp firms are located on Costa Rica's Pacific coast. Most of their production is for the domestic market, any surplus being sold to the Puntarenas exporting firm described above. It is estimated that, on the average, 30 vessels fish for shrimp on Costa Rica's west coast. There is considerable variation in the fleet as vessels move from one fishery to another.

Caribbean Spiny Lobster Fishery: The spiny lobster fishing industry of Limon Province on Costa Rica's east coast depends on the movements of a migratory spiny lobster species (Panulirus argus). Between September and January, gravid females arrive along the coast. They are protected by conservation measures. The Costa Rican spiny lobster season in the Caribbean opens when male spiny lobsters start to arrive in October. They arrive from the north, apparently following the ocean currents prevailing during that time of year. The main harvest lasts from November to February and ordinarily by the middle of March the last spiny lobsters have departed. The size of the migratory population appears to follow a cyclical trend, but no accurate data is available to establish the cycle and predict future harvests.

Recently a French firm applied to Costa Rica for permission to fish for spiny lobsters off the Costa Rican east coast, using ocean-going vessels with nets. The company planned to use 3 vessels ranging from 250 to 300 tons. There was strong opposition from local fishermen, and the request of the French firm was denied by the Government of Costa Rica.

In early fall 1964, large numbers of spiny lobsters were arriving off Limon, stirring optimism about the 1964/65 season.

Marine Turtles: A Japanese visitor was in Costa Rica in early 1964 studying the possibility of expanding the marine turtle fishery. Two new Costan Rican companies were formed to participate in the turtle fishery, and the Japanese visitor returned to Japan, reportedly to interest Japanese investors in the two companies. (United States Embassy, San Jose, October 2, 1964.)

Cuba

EXPANDED FISHERIES CLAIMED
RESULT OF SOVIET AID:

The Second Session of the joint Soviet-Cuban Fisheries Commission opened in Moscow, September 1, 1964. According to the Soviet Fisheries Minister, who was the principal speaker, the Cuban fishing industry has now been established and is showing excellent results, with fishery landings almost doubled in a few years. He also mentioned the development, with Soviet help, of a deep-sea fishing fleet and the newly-built processing plants that will make it possible to handle the increased catch and satisfy the Cuban demand for fishery products.

Cuba (Contd.):

The meetings of experts which followed the opening session discussed mainly the increased cooperation in the field of fisheries between Cuba and the Soviet Union during 1965. The most important decisions made at those meetings were:

1. The Soviet Union will make available to Cuban scientists all reports on its fishery research in the Atlantic Ocean.

2. In 1965, two modern fishery research vessels will be sent to Cuba.

3. Over 70 Soviet fishery specialists will go to Cuba to instruct in various phases of the fishing industry.

4. About 100 Cuban students will be sent to the Soviet Union to study in Soviet universities and specialized fishery schools.

Note: See Commercial Fisheries Review, November 1964; June 1963 p. 68.

Denmark

COPENHAGEN FISHERIES TRADE FAIR HELD IN SEPTEMBER 1964:

The Fifth International Fisheries Trade Fair (sponsored by the Danish fishing industry) was held September 11-20, 1964, in Copenhagen. The products displayed by 200 exhibitors from 14 countries ranged from electronic fish-detectors to plastic fish containers. Manufacturers of marine motors and fishing nets had the largest number of exhibits at the Fair. A Swedish manufacturer gave floor demonstrations of several fish-processing machines, including one for filleting herring. That 2-man machine is said to have a capacity per minute of 250-300 herring (size $6\frac{1}{2}$ to $10\frac{1}{2}$ inches).

The Association of Fish Exporters of Denmark set up a special desk at the Fair to give visitors information regarding Danish fishery products for export.

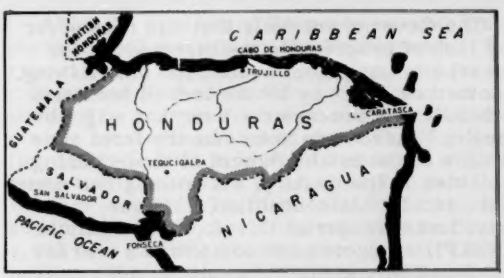
The Fair attracted more buyers from Germany, Norway, and Denmark than any previous Copenhagen fisheries trade fair, although the overall attendance of 36,578 visitors at the Fifth International Fisheries Trade Fair did not match that of the last fair. (Assistant Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, September 30, 1964.)

Note: See Commercial Fisheries Review, April 1964 p. 57.

El Salvador

FISHERIES TO BE AIDED BY UNITED NATIONS SPECIAL FUND:

A 13-man team of fishery experts is expected to arrive in El Salvador early in 1965



to provide technical assistance to the local fishing industry. The team is a part of a US$1.5 million six-year assistance program to Central America to be financed from the United Nations Special Fund. The program was drawn up at the request of the Ministers of Agriculture of the five Central American countries earlier this year. It is understood that one of the projects to be carried out will be an 18-months survey of deep-water shrimp resources.

Red Shrimp Fishery: El Salvador's Minister of Economy has announced that licenses to engage in deep-sea red-shrimp fishing will not be granted to individuals, but only to companies or corporations. The Ministry's decision reportedly was based on the large investment needed to engage in red-shrimp fishing. To encourage the immediate start of such a fishery, the Ministry is prepared to grant two-year concessions to local operators to lease United States or Mexican vessels. After the two-year trial period, the local companies are expected to be in a position to acquire their own vessels or equipment.

According to a Ministry official, there is considerable investor interest, both local and foreign, in a red-shrimp industry.

El Salvador (Contd.):

Tuna Fishery: The El Salvador Government has been disappointed at the lack of progress in developing a local tuna fishing industry. Although a considerable number of local investors had applied for and been granted licenses to engage in tuna fishing, no such fishing had been done as of this past fall, and most of the licenses granted expired or became invalid because of noncompliance with the terms of issuance which required the beginning of tuna fishing within six months after authorization.

The Government feels that one reason for the lack of progress is the high cost of the vessel and equipment needed for tuna fishing. Another reason may be the lack of facilities to handle and process the tuna that might be caught. There have been rumors from time to time of the establishment of tuna-canning facilities in the country, but nothing has materialized. In this connection, however, the Salvadoran Industrial Development Institute (INSAFI) conducted and completed a market and feasibility study for a tuna canning operation and positive developments may be forthcoming.

Fresh-Water Fishery: This past July, the Pisciculture Section of the Ministry of Agriculture released a little over 4,000 Tilapia mozambica in El Salvador's three principal rivers.

There were some reports that there was a shortage of fish in Lake Coatepeque and that it created an economic hardship to some 300 to 400 fishermen who earn their livelihood from the lake. Supposed spokesmen for the fishermen reported that the fish catch in the lake has been declining steadily since the Government planted about 400 Mojarra azul (Cichlasoma guttulatum) about five years ago. The spokesmen recommended that the Government plant Guapote tigre (Chichlasona managüense) and Lobina negra (Micropteros salmoides) instead. The Government insists that the fish it planted is not carnivorous and that the two species recommended are.

The controversy was reported to be basically the old one of sport fishing versus commercial fishing. The so-called spokesmen for the fishermen did not gain their livelihood from fishing, it was reported, and were interested in having the lake stocked with game fish for their own personal business reasons. The Government was said to have produced several fishermen who said they make a reasonable living catching and selling the Mojarra azul. There was no overall shortage of fish in the lake, they said, just a shortage of game fish. (United States Embassy, San Salvador, September 30, 1964.)

Fiji Islands

EX-VESSEL TUNA PRICES AT JAPANESE BASE:

The following ex-vessel prices as of early October 1964 were being paid for top quality long-line caught tuna landed at the Japanese tuna base located at Levuka, Fiji Islands:

Species	Price	
	Yen/Kg.	US$/Short Ton
Albacore (round)	110	277
Yellowfin (gilled & gutted):		
Small (10-36 kg.)[1]	85	214
Medium (36-45 kg.)[2]	85	214
Large (over 45 kg.)[3]	70	176
Big-eyed (gilled & gutted) (over 15 kg.)[4]	55	139
Bluefin (gilled & gutted)	60	151

1/22-79 lbs.
2/79-99 lbs.
3/Over 99 lbs.
4/Over 33 lbs.

The above prices were to be effective August 12-December 31, 1964. The price of second quality fish was one-half that for top quality fish. All prices are subject to negotiation after December 31, 1964, if changes in price structure should occur before that date at other nearby tuna bases (e. g., American Samoa and New Hebrides). (Suisan Keizai Shimbun, October 11, 1964.)

France

HERRING IMPORTS FROM OTHER EEC COUNTRIES SUBJECT TO MINIMUM PRICE REGULATIONS:

A complicated mechanism to withhold French import licenses from herring offerings from other European Economic Community (EEC) countries, after prices in the French market sink below a stated minimum for 3 successive days, has been established by France (Journal Officiel, September 23, 1964). The new system is to be in effect from September 23, 1964, until February 15, 1965, and may be extended for an additional period.

France (Contd.):

In a letter to the EEC Commission, the French Government had previously noted that large herring imports from the other EEC countries were disturbing the local herring market and endangering the financial structure of the French fishing industry. It was further noted that herring from the Netherlands had been offered at 0.35 French franc per kilogram (about 3 U.S. cents a pound) free at France's border, while the average price for French herring varied from 0.70 to 1 franc a kilogram (6.5 to 9 cents a pound).

About 24 percent of France's herring imports in 1963 were from the Netherlands. A report of the Netherlands Ministry of Agriculture and Fisheries shows that Dutch exports of fresh herring to France amounted to 6,200 metric tons with a value of about Fl.2.4 million (US$662,000) in 1963 as compared with exports to all countries totaling 21,748 tons worth about Fl.14.7 million ($4.1 million). Also, in 1963 the Netherlands exported to France 4,433 tons of salted herring valued at Fl.2.7 million ($745,000), and 1,468 tons of mackerel worth Fl.617,000 ($170,000).

The new price maintenance and import regulation program will probably be confined to herring, because French fishermen are not as sensitive to imports of other species. Tuna, for example, is imported in sizable quantities, but it is more easily absorbed by the local market. Another reason that the French Government might be reluctant to extend the program is that herring enter France only at Boulogne-Sur-Mer, and thus price control services need be established only at that port. However, extending the scheme to include other fish, and thus other ports of entry and sale, would require a new government service to observe and control prices; an operation considered technically feasible but very expensive to administer. (United States Embassy, Paris, October 15, 1964, and United States Embassy, The Hague, September 15, 1964.)

Notes: (1) Netherlands florin (or guilder) 3.613 equal US$1.00.
(2) French franc 4.90 equal US$1.00.

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FRANCE SETS MINIMUM PRICES ON HERRING IMPORTS:

The French Government recently informed the European Economic Community Commission (EEC) and its five EEC partners that starting September 21, 1964, minimum prices for imported herring would be applied. In a letter to the EEC Commission, the French Government noted that large herring imports from the other EEC countries were disturbing the local herring market and endangering the financial structure of the French fishing industry. It was further noted that herring from the Netherlands had been offered at 0.35 French franc per kilogram (about 3 U.S. cents a pound) free at France's border, while the average price for French herring varied from 0.70 to 1 franc a kilogram (about 6.5 to 9 cents a pound).

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The Netherlands Ministry of Agriculture and Fisheries had not yet received the French "declaration of intent" and was unable to comment on which products would be affected by the French move.

Note: One Florin or guilder equals $0.276.
One French franc equals $0.204.

German Democratic Repubic

FISHING FLEET PLANNED FOR ATLANTIC FISHERIES:

The Institute of High Sea Fishing at Rostock-Marienehe in East Germany has begun intensive scientific preparations aimed at an early entry of the East German fishing fleet into the Northwest and Southwest Atlantic

"Tropik"-class large stern trawler and freezer.

German Democratic Republic (Contd.):

fisheries. As the basis for this work, the Institute is relying heavily on Soviet and Polish scientific fishery literature dealing with those two Atlantic fishing areas. (Le Marin, August 28, 1964.)

East Germany's delivery of 65 "Tropik" class vessels (stern trawlers and freezers) for the Soviet Union is to be completed by 1965. From available information, it seems that East Germany will continue the construction of "Tropik"-class fishing vessels for her own fleet, after fulfilling the contract with the Soviets.

Ghana

LARGE TRAWLER BUILT BY JAPAN:

The first of 10 stern trawlers contracted for delivery to a Ghana fishing corporation was completed at a shipyard in Japan. It is being equipped for its maiden voyage at the port of Tobata. The 1,980-gross-ton vessel will be manned by 25 Japanese nationals who will train Ghanaian nationals in the vessel's operation and in fishing techniques.

The vessel's specifications are: length--72 meters (236 feet); beam--12.5 meters (41 feet); speed--14.6 knots.

The second trawler for delivery to Ghana was scheduled for completion in late November 1964. (Minato Shimbun, October 13, 1964.)

Note: Earlier press reports indicated Ghana had contracted for delivery of twelve 1,800-ton trawlers.

Greece

FREEZER-TRAWLER LANDINGS AND FISHERY TRENDS, JULY 1964:

Landings: The Greek fleet of refrigerated trawlers and carrier vessels operating in the Atlantic landed 2,335 metric tons of frozen fish in Greek ports in July 1964. That was about the same as the 2,343 tons landed in June 1964, but much above the 801 tons landed in July 1963.

Greek frozen fish landings during January-July 1964 amounted to 11,985 tons, compared

with landings of 10,396 tons in the same period of 1963, and 8,672 tons in the first 7 months of 1962.

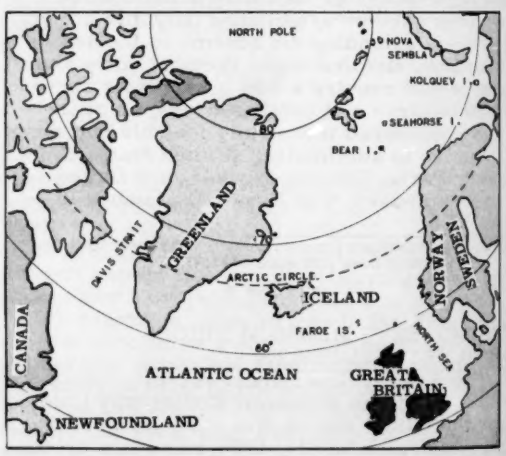
Atlantic Exploratory Trawling Project: It has been reported that the Fisheries Department of the Greek Government will charter a freezer-trawler for exploratory fishing in the Atlantic. The Greek Government will contribute Dr 2.5 million (US$83,333) of the Dr 3.0 million ($100,000) needed for the exploratory operation. The remaining Dr 0.5 million ($16,667) will be contributed by the Greek freezer-trawler companies. A primary objective of the project is to locate new trawling grounds. (Alieia, August 1964.)

Notes: (1) Greek drachma 30.0 equals US$1.00.
(2) See Commercial Fisheries Review, Nov. 1964 p. 84.

Greenland

FISHING RIGHTS AGREEMENT SIGNED WITH FAROE ISLANDS:

Revision of the fisheries agreement between the local governments of Greenland and the Faroe Islands was signed in Godthaab,



Greenland (Contd.):

Greenland, on September 19, 1964. The revision grants the Faroese the rights to establish and maintain until 1975 another fisheries station in East Greenland and continues the present rights of Greenlanders to fish in Faroese waters.

The new agreement falls far short of meeting the demands of the two parties. The Greenlanders originally insisted that the Faroese should close their fisheries stations in Greenland and land their catches at the new local Greenland fish plants, while the Faroese wanted fishing rights in Greenland waters equal to those granted resident vessels. Both demands were dropped in the final agreement. (United States Embassy, Copenhagen, September 23, 1964.)

Note: See Commercial Fisheries Review, October 1964 p. 57.

Iceland

HERRING EX-VESSEL PRICES SET:

Effective October 1, 1964, minimum ex-vessel prices for south and west coast herring were set by the Icelandic Fishing Industries Price Committee as follows:

(1) Herring for freezing, salting, and filleting--Kr.1.70 per kilo (1.79 U.S. cents per pound).

(2) Iced herring for export or for canning--Kr.1.55 per kilo (1.63 U.S. cents per pound).

(3) Herring for reduction--Kr.1.02 per kilo (1.07 U.S. cents per pound).

(4) Herring for animal feed--Kr.1.25 per kilo (1.32 U.S. cents per pound).

The prices are for herring delivered to transport vehicles at dockside. In the case of herring for reduction, vessel owners are asked to deliver the catch directly to the factory, and they receive a small additional payment to cover transportation charges.

In addition to the above minimum prices, the price for small herring (5-19 herring per kilo) caught from March 1 to September 30, 1965, for freezing was fixed at Kr.1.27 per kilo (1.34 U.S. cents per pound).

The new prices represent a considerable change from 1963. The comparable minimum ex-vessel price in 1963 for herring for salting was Kr.1.42 per kilo (1.50 U.S. cents per pound) and for herring for filleting it was Kr.1.12 per kilo (1.18 U.S. cents per pound). The ex-vessel price for herring for freezing in 1963 was Kr.1.84 per kilo (1.94 U.S. cents per pound). The 1964 freezing price is down 7.6 percent from the previous year, but the 1964 salting and filleting prices are considerably above comparable 1963 prices. (United States Embassy, Reykjavik, October 6, 1964.)

Note: Icelandic Kronur 43.06 equal US$1.00.

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FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-MAY 1964:

Species	January-May	
	1964	1963
	(Metric Tons)	
Cod	240,889	176,938
Haddock	24,714	23,468
Saithe	12,250	5,273
Ling	2,826	3,676
Wolffish (catfish)	6,858	9,637
Cusk	2,719	4,517
Ocean perch	8,630	11,875
Halibut	331	406
Herring	72,497	96,050
Shrimp	89	349
Capelin	8,640	1,077
Lobster	254	72
Other	2,078	1,681
Total	382,775	335,019

Note: Except for herring which are landed round, all fish are drawn weight.
Source: Aegir, September 1, 1964.

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FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-JUNE 1964

Species	January-June	
	1964	1963
	(Metric Tons)	
Cod	247,140	194,663
Haddock	27,140	26,003
Saithe	14,294	6,810
Ling	3,175	3,851
Wolffish (catfish)	7,182	10,942
Cusk	2,745	4,719
Ocean perch	11,534	14,718
Halibut	479	502
Herring	152,611	134,497
Shrimp	138	349
Capelin	8,640	1,077
Lobster	1,228	1,559
Other	3,350	2,862
Total	479,656	402,552

Note: Except for herring which are landed round, all fish are drawn weight.
Source: Hagtidindi, September 1964

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Iceland (Contd.):

UTILIZATION OF FISHERY LANDINGS, JANUARY-MAY 1964:

How Utilized	January-May	
	1964	1963
	(Metric Tons)	
Herring 1/ for:		
Oil and meal	59,642	65,570
Freezing	9,624	17,388
Salting	3,231	7,475
Fresh on ice	-	5,617
Groundfish 2/ for:		
Fresh on ice	17,235	16,929
Freezing and filleting	119,738	97,271
Salting	78,543	59,025
Stockfish (dried unsalted)	78,035	56,903
Canning	24	35
Home consumption	5,943	6,080
Oil and meal	1,777	1,227
Capelin for:		
Freezing	133	188
Oil and meal	8,507	889
Shrimp for:		
Freezing	53	267
Canning	36	82
Lobster for:		
Fresh on ice	-	2
Freezing	254	71
Total production	382,775	335,019

1/ Whole fish.
2/ Drawn fish.
Source: Aegir, September 1, 1964

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UTILIZATION OF FISHERY LANDINGS, JANUARY-JUNE 1964:

How Utilized	January-June	
	1964	1963
	(Metric Tons)	
Herring 1/ for:		
Oil and meal	146,766	103,216
Freezing	11,161	19,153
Salting	3,231	7,475
Fresh on ice	-	5,617
Groundfish 2/ for:		
Fresh on ice	19,310	18,756
Freezing and filleting	128,818	109,955
Salting	80,502	63,314
Stockfish (dried unsalted)	79,125	63,923
Canning	117	149
Home consumption	7,052	7,078
Oil and meal	2,208	2,008
Crustacea for:		
On ice	-	2
Freezing	1,330	1,824
Canning	36	82
Total production	479,656	402,552

1/ Whole fish.
2/ Drawn fish.
Source: Haqtidindi, September 1964

Italy

ATLANTIC FISHING FLEET, 1964:

Early in 1964, the Italian fishing fleet operating in the Atlantic consisted of 51 vessels, according to the Federazione Nazionale delle Imprese di Pesca. The Italian Atlantic fleet had a combined gross tonnage of about 24,400 tons. It included 5 vessels of over 1,000 gross tons (totaling 7,500 tons); 10 vessels of from 500 to 1,000 gross tons (totaling 6,400 tons); and 36 vessels under 500 gross tons (totaling 10,500 tons).

Typical Italian trawler that fishes in the Atlantic. Larger ones have been built in recent years.

In 1964, Italian shipyards were reported to be building for the Atlantic fleet an additional 16 vessels with a combined gross tonnage of 6,500 tons. The new construction includes 4 freezer-trawlers being built in Viareggio and 2 tuna vessels being built in Venice.

New Freezer-Trawlers: The 4 freezer-trawlers being built at Viareggio have the following characteristics: length overall 57.46 meters (188.5 feet), length between perpendiculars 50.55 meters (165.8 feet), draft with full load 3.7 meters (12.1 feet), size of refrigerated hold 500 cubic meters (654 cubic yards), and gross tonnage 499 tons. Each vessel will have a 1,065-horsepower engine which will give a speed of 12.5 knots.

The 4 freezer-trawlers are designed to operate in tropical waters. They will each have a -40° C. (-40° F.) quick-freezing plant with a potential capacity of 15 tons every 24 hours, and a cold-storage hold with temperature of -25° C. (-13° F.). They are also equipped with electrical winches, 2 echo-sounders, radiotelephone, and a radar set with a radius of 50 miles. Each vessel has air-conditioned quarters for a crew of 36.

The first of the new Viareggio freezer-trawlers was launched April 9, 1964. Prefabricated construction methods are speeding the completion of the other three.

New Tuna Vessels: The new Atlantic tuna vessels being built in Venice will each have a length of 66 meters (216.5 feet), a main engine of 1,400 horsepower, and a gross tonnage of about 750 tons. (La Pesca Italiana,

Italy (Contd.):

January and February 1964; Corriere della Pesca, April 1964.)

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FISH CONSUMPTION:

Consumption of fishery products in Italy was estimated at about 5.4 kilograms (11.9 pounds) per capita in 1961 (270,000 metric tons of fish were available for consumption by 50 million inhabitants). A public opinion study by a research institute has probed further into Italian fish-buying habits. The study was based on a sample of 4,000 families from various regions and social groups.

An area sample (during an average week) showed that 38 percent of the fish-consuming families were in southern Italy, 18 percent in central Italy, 19 percent in northeast Italy, and 25 percent in northwest Italy. The highest rate of fishery purchases was found in the island Province of Sardinia. Families on farms and in small towns had lower average fishery purchases than families in cities.

The survey also showed that young housewives buy the most fish; half the families in which the housewife was less than 35 were fish consumers, but the ratio dropped to one-third when the housewife was older. (La Pesca Italiana, February 1964.)

Japan

FROZEN TUNA EXPORT PRICES:

Japanese frozen albacore (round) exports from Japan proper to the United States continued slow in early October 1964, with export prices down to US$355-360 a short ton c. & f. Japanese Atlantic-caught albacore delivered to transshipment ports brought around $295-300 a short ton.

On the other hand, the price of frozen yellowfin (gilled and gutted) exported from Japan proper to the United States held steady at $350-355 a short ton c. & f. (Suisan Tsushin, October 12, 1964.)

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EXPORT VALIDATIONS FOR FROZEN TUNA AND TUNA LOINS TO U.S., JANUARY-AUGUST 1963-64:

Japan's export validations of frozen tuna and frozen tuna loins to the United States in August 1964 totaled 12,436 short tons. Of that total, 55 percent of the validations were for albacore tuna, 42 percent for yellowfin, 0.5 percent for skipjack, and 2.2 percent for tuna loins.

During January-August 1964, Japan's export approvals amounted to 75,755 short tons, an increase of 25,227 tons

Japan's Export Validations for Frozen Tuna and Tuna Loins to U.S.
January-August 1964 with Comparisons

Species	Aug. 1964			Jan.-Aug. 1964			Jan.-Aug. 1963		
	Direct	Trans-shipped	Total	Direct	Trans-shipped	Total	Direct	Trans-shipped	Total
	(Short Tons)								
Albacore, round	1,387	5,470	6,857	17,036	23,693	40,729	5,215	17,145	22,360
Yellowfin:									
Round	-	325	325	-	941	941	-	468	468
Gilled & gutted:									
20/100 lbs.	3,050	166	4,125	18,720	2,348	21,068	13,408	3,665	17,073
100 lbs. up	257	-	257	1,774	-	1,774	-	-	-
Drsd. with tail	-	531	531	25	3,307	3,332	671	3,181	3,852
Fillets	-	-	-	33	12	45	227	104	331
Total	4,216	1,022	5,238	20,552	6,608	27,160	14,306	7,428	21,734
Big-eyed:									
Gilled & gutted:	-	-	-	30	30	60	20	4	24
Drsd. with tail	-	-	-	-	170	170	-	240	240
Fillets	-	-	-	37	3	40	6	42	48
Total	-	-	-	67	203	270	26	286	312
Bluefin fillets	-	-	-	-	1	1	-	374	374
Skipjack, round	-	66	66	8	2,866	2,874	70	2,312	2,382
Loins:									
Albacore	80	-	80	2,197	-	2,197	1,343	-	1,343
Yellowfin	195	-	195	2,534	-	2,534	1,667	-	1,667
Bluefin	-	-	-	-	-	-	157	-	157
Total	275	-	275	4,731	-	4,731	3,366	-	3,366
Grand Total	5,878	6,558	12,436	42,384	33,371	75,755	22,983	27,545	50,528

Source: Japan Tuna Fishing Industry Association.

Japan (Contd.):

or 49.9 percent as compared with 50,528 tons exported during the same period in 1963. On a species basis albacore exports were up 82.2 percent, yellowfin 25 percent, skipjack 20.7 percent, and tuna loins 40.3 percent. Big-eyed exports were down 15.6 percent.

Frozen tuna approved for export during January-August 1964 amounted to 93.8 percent of the total exported during the entire year in 1963. (Fisheries Attache, United States Embassy, Tokyo, September 19, 1964.)

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ATLANTIC OCEAN ALBACORE TUNA FISHERY AND MARKET TRENDS:

The Japanese albacore tuna fishery in the Atlantic Ocean off Angola, which in past years usually picked up in November, began exceptionally early this year, with excellent catches reported in September 1964.

Export prices of Japanese frozen round albacore delivered to West African ports were reported to range from US$295-300 a short ton. On the other hand, exports to Yugoslavia were at $405 a metric ton c.& f., and to Spain $380 a metric ton c.& f. From the standpoint of price, it is reported that it would be more advantageous to deliver tuna to the West African ports than to Spain. (Suisan Tsushin, September 25, 1964.)

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TUNA MOTHERSHIP OPERATIONS IN SOUTH PACIFIC:

A large Japanese fishing company's tuna mothership Shinyo Maru (3,800 gross tons) accompanied by 45 catcher vessels was scheduled to depart Tokyo on October 3 or 4, 1964, for the tuna fishing grounds off the Fiji Islands. The mothership's catch target is 5,500 metric tons of tuna, spearfish, and shark.

That same company's Yuyo Maru (5,500 gross tons) tuna mothership fleet, operating near the Fiji Islands, was reported to have landed 5,700 metric tons of tuna (nearly half yellowfin tuna) and other miscellaneous fish as of September 15, and was expected to return to its home port in Japan.

The tuna mothership Nojima Maru (8,800 gross tons) was scheduled to arrive at Kobe on September 28. The mothership, which commenced fishing May 26 in the vicinity of Tahiti, produced 1,974 metric tons of round albacore, 702 metric tons of gilled and gutted yellowfin, and 843 tons of tuna fillets. (Suisan Tsushin, September 26; Suisancho Nippo, September 17, 1964.)

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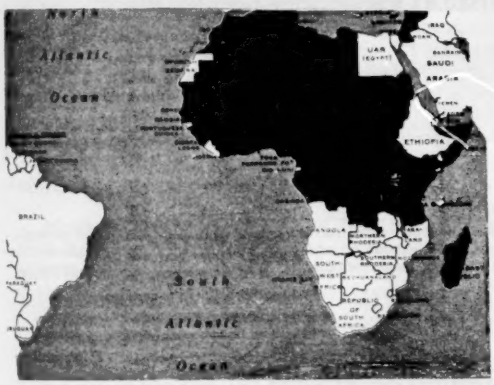
FISHING FIRM GRANTED LICENSE TO FISH WITH PURSE SEINES OFF AFRICA:

A license to fish for skipjack tuna and other fish species off the West Coast of Africa with purse seines was granted to a leading Japanese fishing company, according to Japan's Fishery Agency. In Japan, purse seines are used to catch skipjack, sardines, mackerel, horse mackerel, and several other species.

Operations of that fishing company will be based at Freetown (Sierra Leone), Abidjan

Japan (Contd.):

(Ivory Coast), and Cape Verde off Northwest Africa). Fishing will be conducted by two vessels, the Kuroshio Maru No. 81 and the Kuroshio Maru No. 82 (145 gross tons each). Those vessels were en route to the West African fishing grounds as of mid-September. The Chichibu Maru No. 2 (1,639 gross tons), which will act as the mothership for the fishing vessels, was scheduled to depart from Japan on September 17.



It is reported that the major portion of the skipjack tuna catch will be sold to a United States fish packing firm, now actively engaged in the purchase of fish in West Africa. (Fisheries Attache, United States Embassy, Tokyo, September 18, 1964.)

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INDIAN OCEAN TUNA TRANSSHIPMENT PORTS DESIGNATED:

Durban, South Africa, and Port Louis, Mauritius Island, were formally designated as transshipment ports for the Indian Ocean by the Japan Export Frozen Tuna Producers Association at an executive meeting in Tokyo, October 12, 1964. Each of the two ports was granted frozen tuna export quotas of 2,000 metric tons. (Suisancho Nippo, October 14, 1964.)

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LONG-LINE TUNA FISHERIES CATCH, 1963:

The 1963 catch of Japan's tuna long-line fisheries totaled 532,000 metric tons (0.4 percent less than in 1962) and comprised 7.9 percent of total fish landings, according to statistics released by the Fisheries Statistics Section, Ministry of Agriculture and Forestry. By species, the catch of yellowfin and albacore declined, respectively, 19,000 and 7,000 tons while the catch of bluefin and big-eyed increased, respectively, 11,000 and 3,000 tons.

By fishing grounds, the catch in the Pacific Ocean totaled 322,000 tons (down 10,000 tons), Atlantic Ocean 110,000 tons (up 13,000 tons), and Indian Ocean 100,000 tons (down 24,000 tons). (Suisan Keizai Shimbun, October 7, 1964.)

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UNIVERSITY'S STUDY OF ATTRACTING DEEP-SWIMMING ALBACORE TUNA TO SURFACE:

The Tokai University of Japan announced in October 1964 the results of eight years of field testing different methods of attracting deep-swimming albacore tuna to the surface where they can be fished with pole-and-line gear. The study revealed that trolling a line to which 50-60 artificial (vinyl) squid and octopus are attached is very effective in attracting albacore to the surface, even to the stern of vessels. Hooks are not used, thereby avoiding the danger of hooked albacore escaping and scaring away the fish school.

There were some schools that could not be lured to the surface without chumming with live bait (sardines) and the laboratory is now planning to experiment with artificial sardine lures next year. (Suisan Keizai Shimbun, October 9, 1964.)

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EX-VESSEL BLUEFIN TUNA PRICES IN NORTHERN JAPAN:

A 172-pound fresh prime bluefin tuna landed at the port of Shiogama, Miyagi Prefecture, Japan, brought the fabulous price of 2,260 yen a kilogram (US$5,696 a short ton). The bluefin was caught by a two-boat purse seiner off the Sanriku coast.

At Hachinohe, Aomori Prefecture, 150 small fresh bluefin brought prices ranging from 500-787 yen a kilogram ($1,260-1,973 a short ton). (Suisan Keizai Shimbun, October 14, 1964.)

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Japan (Contd.):

CANNED SALMON EXPORT PRICES:

The Japanese salmon mothership companies and trading firms have agreed on prices of 118 shillings (US$16.52) a case for 48 ½-lb. cans and 140 shillings ($19.60) a case for 96 ¼-lb. cans f.o.b. Japan for canned silver salmon for export to Great Britain. The price, which includes three shillings ($0.42) for promotion, was scheduled to be formally passed on by the Canned Salmon Sales Company on October 18, 1964.

Reportedly, agreement was reached on an export price of 160 shillings ($22.40) a case (48 ½-lb. cans) f.o.b. Japan for red salmon, but formal adoption of that price was not expected until early October. (Suisan Keizai Shimbun, September 27, 1964.)

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JAPANESE CANNED SALMON SALE TO GREAT BRITAIN:

The Japanese Canned Salmon Sales Company, on October 19, 1964, released for the second sale to Great Britain a total of 156,000 cases of canned (fancy) red salmon, consisting of about 118,000 cases of 48 ½-pound cans and 38,000 cases of ¼-pound cans. Sales were to be concluded by the end of December 1964. Canned red salmon sales for export to Great Britain, including the previous sale, as of mid-October totaled 550,000 cases of 48 ½-pound cans and 200,000 cases of ¼-pound cans. (Suisan Tsushin, October 20, 1964.)

Japanese Export Canned Salmon Prices, c.i.f. Great Britain, 1964

Can and Case Size	Second Sale		First Sale	
	s./d.	US$	s./d.	US$
	(Price Per Case)			
½-lb. 48 cans	160/0	22.40	153/6	21.49
½-lb. 48 cans	102/6	14.35	99/3	13.90
¼-lb. 96 cans	202/6	28.35	196/0	27.44

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POSTPONEMENT REQUESTED IN SALE OF ALASKA SALMON:

Representatives of the Hokkaido (Japan) coastal fishery operators and trap-net operators petitioned the Fisheries Agency to postpone the release on the Japanese market of "poor-quality" salted salmon purchased from Prince William Sound, Alaska. They feared it would adversely affect the sale of domestic-caught salmon. Approximately 1,080 metric tons of Alaska salmon found unsuitable for canning (for export) were reported to have been salted for sale on the Japanese domestic market. (Suisan Tsushin, October 12, 1964.)

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EX-DOCK PRICE FOR CHUM SALMON:

The beach or ex-dock price of fall chum salmon in Hokkaido, Japan, on September 15, 1964, reached a high of 500 yen a kilogram (US$0.63 a pound) for females and 300 yen a kilogram ($0.38 a pound) for males. On September 17, the price declined to 470 yen a kilogram ($0.59 a pound) for females and 250 yen a kilogram ($0.32 a pound) for males.

The chum salmon are being processed as "Aramaki" (lightly salted salmon) for the New Year's trade. (Minato Shimbun, September 29, 1964.)

Note: The fall chum salmon trap fishery in Japan begins generally in mid-September and peaks in October. Female salmon command high prices because of their roe, which is highly prized in Japan.

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MORE TRAWLERS TO FISH IN GULF OF ALASKA:

The Japanese Fisheries Agency is planning on authorizing the operation of 3 to 4 additional trawlers in the Gulf of Alaska in 1965. This will increase the Japanese trawl operations in the Gulf to a total of 10 vessels, including the 6 trawlers presently authorized to conduct experimental operations in that area. The Agency is also planning on establishing the Gulf of Alaska trawl fishery as a regular licensed fishery, depending on the outcome of the Annual Meeting of the International Northwest Pacific Fisheries Commission which convened in Tokyo, November 16, 1964. (Suisan Tsushin, October 12, 1964.)

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BERING SEA BOTTOMFISH CATCH, 1964:

A study made by the Japan Northern Waters Bottomfish Mothership Council reveals that the Bering Sea catch of the 14 mothership-type bottomfish fleets, as of September 20, 1964, totaled 394,000 metric tons, far exceeding the 1963 catch of 311,000 metric tons. Alaska pollock (117,000 metric tons), flatfish (88,000 tons), herring (42,000 tons), and rockfish (38,000 tons) led the landings. Catch of halibut (2,000 tons) and sablefish (6,000 tons) was poor as compared to other years.

Japan (Contd.):

Typical Japanese trawler operating with the Tenyo Maru mothership fleet in the Bering Sea.

Most of the 14 fleets as of late September 1964 had terminated their operations. The motherships Tenyo Maru (11,581 gross tons), Seifu Maru (8,269 gross tons), Itsukushima Maru (5,871 gross tons), Taiyo Maru No. 82 (2,890 gross tons), and the Gyokuei Maru (10,357 gross tons) were en route to Japan. The Soyo Maru (11,192 gross tons) and the Hoyo Maru (14,094 gross tons) were scheduled to depart the fishing grounds by the end of September. Only the Chichibu Maru (7,420 gross tons), which is licensed to fish the year round, remained on the grounds. (Suisan Keizai Shimbun, September 25, 1964.)

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STERN TRAWLERS TO FISH IN BERING SEA:

A Japanese fishing company (affiliated with a larger fishing company) planned to dispatch the 2,900-ton stern trawler Taiyo Maru No. 82 to the Bering Sea on November 1, 1964. The stern trawler (accompanied by one small trawler) was scheduled to operate between Umnak Island and Unimak Island until the end of December.

Another firm's newly constructed 3,500-ton stern trawler Aso Maru (accompanied by one 300-ton trawler) was scheduled to depart from Tobata for the Bering Sea on October 11. That trawler is equipped with canning and shrimp peeling equipment. (Suisancho Nippo, September 10; Minato Shimbun, September 9, 1964.)

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BERING SEA FISH MEAL PRODUCTION, 1964:

The four Japanese factoryships which engaged in fish-meal operations in the Eastern Bering Sea in 1964 produced a combined total of 49,430 metric tons of meal, exceeding their original combined target by about 4,000 metric tons. They primarily used Alaska pollock (80 percent of raw material utilized) for meal.

Typical fishing logbook of the mothership Gyokuei Maru.

Production by fleets was as follows: Gyokuei Maru (10,357 gross tons)--16,000 metric tons; Hoyo Maru (14,094 gross tons)--14,930 tons; Tenyo Maru (11,581 gross tons)--11,500 tons; and Soyo Maru (11,192 gross tons)--7,000 tons. (Suisan Tsushin, October 13, 1964.)

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FIRM WITHDRAWS TRAWLER FACTORYSHIP FROM NORTHWEST ATLANTIC:

A large Japanese fishing company has withdrawn from the Northwest Atlantic the 3,500-ton trawler-factoryship Tenyo Maru No. 3. The trawler-factoryship (accompanied by two 300-ton trawlers) operated in the Northwest Atlantic for about one year on an experimental basis, but the owners have reached the conclusion that factoryship-type trawl operations are unsuitable for that area. The Tenyo Maru terminated operations on October 20, 1964, and was scheduled to arrive in Japan around mid-December. The owners are exploring the possibility of operating several 350- to 500-ton trawlers in that region from a fishing base in Newfoundland, Canada.

Japan (Contd.):

A second Japanese fishing firm (which operated the stern trawler Aoi Maru, 1,386 gross tons, on an experimental basis for approximately two years) withdrew its vessel at the end of July 1964, due to losses suffered from that venture. The trawler was sold to Greece and will operate in the waters off West Africa out of Las Palmas, Canary Islands. (Suisan Tsushin, October 20, 1964.)

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NEW STERN TRAWLER FOR AFRICAN WATERS:

A new stern trawler, the Oshika Maru (3,000 gross tons), was completed by a Japanese shipyard and delivered to the Ojika Fishermen's Production Association in Japan which plans to operate the vessel in African waters.

The vessel has an extensive automation and remote control system for her main propulsion and auxiliary machinery and is Diesel-powered for a maximum of 3,500 b. hp. Trial runs of the vessel registered 15.94 knots per hour. The stern-engine design of the vessel was chosen because of certain operational advantages, such as torsional vibration of the shaft, and also because of the fish hold capacity, and capacity of water and petroleum tanks, as well as drafts at stern and bow of the vessel.

The vessel's main dimensions are: length between perpendiculars 285 feet 4 inches; moulded breadth 48 feet 9 inches; moulded depth 23 feet 5 inches; draft (designed full load) 19 feet 7 inches. The wheelhouse has a 360° field of vision which not only enables the men on the bridge to exercise concentrated supervision of fishing operations but also makes possible the observation of its trawl winch operated from a command position astern.

The vessel is equipped with radar and latest type fish finder, has a loran receiver, and various navigational instruments for safe and efficient vessel operation. Fish holds and processing facilities are located between decks starting from the vessel's stern--fish processing plant, cold-storage and freezer room, lobby and fish holds, in that order. Living accommodations for the crew are in the forward area of the upper deck. (Newsletter of Mitsubishi Heavy Industries, Ltd.)

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USE OF OKINAWANS ON TRAWLERS UNDER STUDY:

The Nihon Isei Sokobikiami Kyokai (East China Sea Trawl Operators Association of Japan) is exploring the possibility of employing Okinawan fishermen to sail on the vessels operated by members of the Association. Reportedly, the East China Sea trawl operators, like vessel owners engaged in other fisheries in Japan, are experiencing great difficulty attracting young men into the fishery.

The shortage of fishing labor force in Japan is becoming acute. Young people, attracted by the land-based industries, are not interested in engaging in fishing. Those that engage in fisheries prefer to be connected with the large fishing companies.

To alleviate the fishing labor force shortage, consideration at one time was given to the possible employment of South Koreans. The idea was not feasible due to existing political, legal, and social relations between South Korea and Japan.

A study made by a member of the Trawl Operators Association on the Okinawan fishing labor force indicated that the Okinawan fisheries are also faced with a labor shortage but the shortage is nowhere near as acute as that in Japan. The study showed that working conditions and facilities on Japanese vessels are superior to those on Okinawan vessels. Also, the living standard of Japanese fishermen is higher. For example, the average income of a Japanese fisherman sailing on a trawler operating in the East China Sea amounts to 50,000 yen (US$139) a month as compared to an Okinawan trawl fisherman's monthly average income of 30,000 ($83). Furthermore, the Okinawans are not only good fisherman but have close political and social ties with Japan. For those reasons, the Association feels the idea of employing Okinawan fishermen has much merit and plans to study the matter carefully. (Suisan Keizai Shimbun, October 22, 1964, and other sources.)

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ALUMINUM FISH HOLD FOR FISHING VESSEL:

The leading Japanese aluminum manufacturer has been awarded a contract to construct an aluminized fish hold for the Chiba Prefectural Government's tuna fishery guidance ves- Boso Maru (500 gross tons). Extensive tests conducted by the manufacturer have shown aluminum to be absolutely safe for use in con-

Japan (Contd.):

structing fish holds. Advantages cited are the lightness of the metal, better fish-holding quality, and improved sanitation. (Suisan Keizai Shimbun, October 20, 1964.)

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JAPAN EXTERNAL TRADE PROMOTION ORGANIZATION ASSIGNS AGENT IN AMERICAN SAMOA:

JETRO (Japan External Trade Promotion Organization) has assigned an agent in American Samoa for the first time. The new agent, JETRO's former agent at Long Beach, was scheduled to leave for Samoa in October 1964.

The Japanese Government and the Japan Frozen Foods Inspection Corporation are sharing expenses equally for the maintenance of JETRO's office in Samoa. (Suisan Keizai Shimbun, October 9, 1964.)

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CANNED SHRIMP EXPORTS TO GREAT BRITAIN:

Two of Japan's major fishing companies, which operate shrimp factoryships in the Eastern Bering Sea, are reported to be developing plans to increase their exports of canned shrimp to Great Britain.

Japanese 1963 exports of canned shrimp to Great Britain totaled 71,000 cases and to the United States 390,000 cases. In 1964 exports to Great Britain are expected to total over 100,000 cases, while exports to the United States are expected to decline by 130,000 cases. (Suisan Keizai Shimbun, October 7, 1964.)

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FIRM EXPERIMENTING WITH CANNED HAKE:

A Japanese fishing company has been experimenting with canning merluza (hake) caught by its trawlers operating off South Africa. The firm was reported to have settled on one product--hake packed in oil. That firm was conducting taste tests and planned to to market that product in Japan in the fall of 1964. (Suisancho Nippo, September 18, 1964.)

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COUNCIL FORMED OF JAPANESE LONG-LINE SEA BREAM FISHERY OPERATORS OFF NEW ZEALAND:

Of the 22 Japanese fishing firms engaged in long-line fishing for sea bream off New Zealand, 14 formed (on October 12, 1964) an organization called the "Council of Longline Fishery Operators Engaged in New Zealand Offshore Sea Bream Fishery." The objectives of that organization are to: (1) eliminate violations of New Zealand territorial waters by Japanese long-line operators; and (2) promote unity and cooperation among the fishery operators in achieving a balance between catch effort and availability, in order to stabilize the fishery and to conserve the resources.

The New Zealand offshore long-line sea bream fishery was first developed by one Japanese fishing company in the summer of 1963. Later, an increasing number of Japanese vessels began to converge on that fishing ground and violations of New Zealand territorial waters by Japanese fishing vessels also began to mount. This resulted in protests being lodged with Japan by that country. In view of the frequency of such infractions, the Japanese Fisheries Agency was planning on sending the vessel Toko Maru to the New Zealand waters in mid-October to patrol Japanese fishing activities. (Suisan Tsushin, October 14; Nihon Suisan Shimbun, October 14; and other sources.)

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VIEWS ON 43RD FAO COUNCIL:

The 43rd Food and Agriculture Organization (FAO) Council, scheduled to convene in Rome, October 5, 1964, had 27 items on the agenda. Two related to fisheries: (1) the strengthening of the FAO Fisheries Division, and (2) the rational utilization of Atlantic tuna resources.

On September 25, Japan's Fisheries Agency firmed its position on those two agenda items. The Agency planned to support the proposal to strengthen the FAO Fisheries Division, but held that the formation of an international research organization (like the Inter-American Tropical Tuna Commission) as proposed by the United States is not necessary. Instead, the Japanese feel that each concerned country should conduct investigations on its own through an exchange of data, and the establishment of some form of organization connected with that type of research would not be positively op-

Japan (Contd.):

posed by Japan. (Suisan Keizai Shimbun, September 26, 1964.)

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FISHING COMPANY EXECUTIVE EXPECTED TO VISIT MEXICO:

The Vice President of a large Japanese fishing firm was scheduled to depart for Mexico in late October 1964 to discuss with Mexican interests the establishment of a joint fishery enterprise in that country. The Japanese firm hopes to establish a joint whaling venture in Mexico and expand its operations to shrimp fishing in the future. (Shin Suisan Shimbun Sokuho, September 25, 1964.)

Republic of Korea

FISHERIES TRENDS, THIRD QUARTER 1964:

Japanese-Korean Fisheries Talks: In early August 1964, the Japanese Foreign Minister and the Korean Ambassador to Japan met to discuss the resumption of fisheries talks between the two countries. After their meeting, it was reported that the Minister and the Ambassador had agreed to resume the fisheries talks in Tokyo in September 1964. The Japanese Minister is also reported to have said that the Japanese Government would try to expedite economic assistance to Korea and to increase imports of farm and fishery products from Korea in order to help balance trade between the two countries. (The Korea Times, August 7, 1964.)

Typical trawler now fishing for Korea, but that country is now expanding its fleet to larger vessels.

(Editor's Note: Early in 1964, it appeared that normal relations between the two countries might be resumed this year if agreement could be reached on fisheries conservation regions, areas for Korea's exclusive fishing, and the amount and type of fisheries cooperation loans that Japan would provide. The talks on fisheries problems were suspended in the spring of 1964 before final agreement was reached.

The Japanese are reported to object to the Korean prohibition of Japanese fishing inside the "Peace Line," which extends at some points as much as 80 miles from Korea's shores. The Japanese have proposed substituting an exclusive Korean fishing zone extending not more than 12 nautical miles from shore. Negotiations have also focused on details regarding the delineation and establishment of a fisheries conservation zone in which fishing would be jointly restricted. Other practices under discussion when the negotiations were suspended in the spring included the type of equipment and number of vessels to be allowed in those conservation areas.

Normal relations with Japan could have an important effect on Korea's fishing industry. Japanese technical and economic assistance could help modernize the Korean fishing industry and increased Japanese imports from Korea could sharply expand Korean fishery shipments.

Shrimp Farming: A total of 800,000 white shrimp were reared by a Korean shrimp farm near Taechon (on the west coast) in its first attempt at cultivation of shrimp. In mid-1964, it was reported that the artificially-reared white shrimp would reach a size of 6 inches by September 1964 when they would be sold to Japan. The shrimp farm expects to expand its rearing area from 16 acres to 62 acres. (The Korea Times, July 17, 1964.)

Oceanography: The Korean Hydrographic Office has decided to participate in an international program of research on the Kuroshio Current, which is one of the main arteries in the circulation of the Pacific Ocean. It moves warm water from the Equator northward past Formosa and Japan and thence eastward across to the American coast, performing functions similar to those of the Gulf Stream in the Atlantic.

Korean officials said that since the warm current houses large quantities of fish, scientific research is needed to assist the fishing industry. They said that the nations interested

Republic of Korea (Contd.):

in the planned 4-year study of the Kuroshio Current are China, Hong Kong, Japan, Korea, the Philippines, United States, U.S.S.R., and Vietnam. (The Korea Times, August 7, 1964.)

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VESSEL SPECIFICATIONS OF FISHING FLEET ORDERED FROM FRANCE:

A fleet of fishing vessels is to built by an Italian-French consortium for the Korea Marine Industry Development Corporation under a contract signed January 21, 1963, and amended December 11, 1963, and February 3, 1964.

Under the amended contract, the French members of the consortium will build 76 vessels for Korea, including 10 side trawlers of 130 gross registered tons (g.r.t.); 61 tuna long-line vessels of 140 g.r.t.; 2 stern trawlers of 200 g.r.t.; 2 stern trawlers of 1,300 g.r.t.; and a research and training vessel of 300 g.r.t.

The 10 side trawlers will be built at Bordeaux. Half of them will have gallows on the port side and the other half will have gallows on the starboard side to enable them to trawl in pairs. Each side trawler will have the following main dimensions: length overall 89.2 feet, breadth (molded) 20.7 feet, and depth (molded) 11.8 feet. Each side trawler will have a fish-hold capacity of 4,062 cubic feet, and each will be equipped with a main Diesel engine developing 460 b. horsepower.

The order for 61 tuna long-line vessels from France is shared by shipyards at Bordeaux (16 vessels), Le Havre (26 vessels), La Rochelle (11 vessels), Nantes (4 vessels), and Dieppe (4 vessels). Delivery will be spread between February 1965 and October 1966.

The tuna vessels will have the following main dimensions: length overall 98.4 feet, breadth (molded) 21.3 feet, depth (molded) 10.2 feet, and fish-hold capacity 4,238 cubic feet (the fish will be stored on ice). Each of the vessels will be equipped with a 460-b. horsepower Diesel engine.

The two 200-ton stern trawlers will be built by a shipyard at Dieppe for delivery in April and July 1966, and will have the following main dimensions: length overall 105 feet, breadth (molded) 23.7 feet, depth (molded) 12.4 feet, and fish-hold capacity 4,769 cubic feet (fish will be preserved on ice). Each of the vessels will be equipped with a 640-b. horsepower Diesel engine.

The two 1,300-ton stern trawlers will be built at Nantes and delivered in December 1965 and March 1966. Both vessels will have freezing facilities and each will have a length overall of 253.7 feet. Other dimensions will be: length between perpendiculars 217.2 feet, breadth (molded) 37.1 feet, depth to main deck 17.4 feet, depth to upper deck 25.3 feet, and loaded displacement 1,946 tons. the frozen fish hold of each vessel will have a capacity of 31,784 cubic feet. A Diesel engine developing 2,500 horsepower will give each vessel a speed of about 14 knots.

The 300-ton research and training vessel is to be built at Dieppe and will be delivered in September 1966. It will be designed for stern trawling and oceanographic research work. It will have an overall length of 123.4 feet, breadth (molded) 26.2 feet, depth (molded) 12.4 feet, and a frozen fish-hold capacity of 636 cubic feet. It will be powered by 2 Diesel engines developing a total of 928 horsepower to give the vessel a service speed of 11.5 knots. It will have accommodations for 5 scientists and 24 trainees, in addition to a normal crew. (World Fishing, September 1964.)

(Editor's Note: According to previous reports, the contract price for the vessels being built in France for Korea is about $18.7 million--not including engines. Marine motors and certain other equipment for the 76 vessels are to be supplied by an Italian group. In addition, the Italian group is to build and outfit a separate fleet of 15 vessels for Korea. The total price of the Italian vessels and supplies amounts to about $17.1 million, bringing the total Korean obligation under the contract with the Italian-French consortium to $35.8 million.)

Note: See Commercial Fisheries Review, April 1964 p. 62; November 1964 p. 98.

Mexico

VESSELS LEAVE MAZATLAN TO OPEN SHRIMP FISHING SEASON:

Some 260 shrimp fishing vessels left the port of Mazatlan on Mexico's west coast Sep-

Mexico (Contd.):

tember 23, 1964, for the new shrimp fishing season. About 60 vessels were unable to leave because they were in need of repairs. Early radio reports from the fleet were pessimistic indicating shrimp catches were smaller than anticipated.

Shrimp fleet at Mazatlan.

The disagreement between Mexican vessel owners and fishermen's cooperatives had not been resolved as of early October. It was reported that one vessel owner planned to send another six vessels to French Guiana in October. (Fisheries Attache, United States Embassy, Mexico, D. F., October 5, 1964.)

* * * * *

CONSTRUCTION OF NEW FISH CANNERY TO BE FINANCED BY SPANISH BUSINESSMEN:

A group of Spanish businessmen will invest about US$670,000 in the construction of a new fish canning plant at Ensenada, Baja California, Mexico. The announcement was made by the Banco de Comercio, Mexico City. (The Fishing News, September 18, 1964.)

* * * * *

USE OF MANATEE TO CONTROL AQUATIC WEEDS IN LAKES:

An experiment in Mexico to overcome the aquatic weed problem at several lakes infested with water hyacinth was started in May 1963. Because of the possible usefulness of manatee (sea cows) in controlling aquatic weeds, the Mexican Government introduced five of them into Lake Chapala, Mexico's largest lake. (Manatee are completely vegetarian and eat great quantities of weeds.) The project was initiated by Mexico's Fisheries Bureau of the Secretariat of Industry and Commerce in cooperation with the State of Jalisco and the Commission for the Promotion of Lake Chapala.

One of the manatee was killed shortly after being placed in the lake, but the other 4 were reported to be thriving, according to a September 1964 report. Fishermen frequently encounter the manatee and occasionally take them in their nets. One of the manatees was known to be ready to give birth when placed in the lake, and fishermen later reported catching and releasing a young one a little over 3 feet long, which is the size at birth.

The manatee in Lake Chapala appeared to be feeding on aquatic plants, it was reported, but because the fishermen had cleared most of the hyacinths mechanically, the animals turned to other varieties of plant pests and are expected to switch to hyacinths when that plant again becomes abundant. The cooperating agencies have posted signs explaining the program and requesting people not to molest the manatees.

The Mexican Fisheries Bureau considers the project to be experimental. The greatest environmental problem is the lower water temperature. The manatees came from the State of Tabasco which has water temperatures of 79° to 82° F. Lake Chapala's water temperature is 68° to 72° F. and is as low as 64° F. in winter. The cooler water may inhibit reproduction. Also, it has not been determined how many animals would be needed to keep the enormous plant population of Mexico's largest lake under control. (Fisheries Attache, United States Embassy, Mexico, D.F., October 2, 1964.)

Note: See Commercial Fisheries Review, October 1964 pp. 107 and 108.

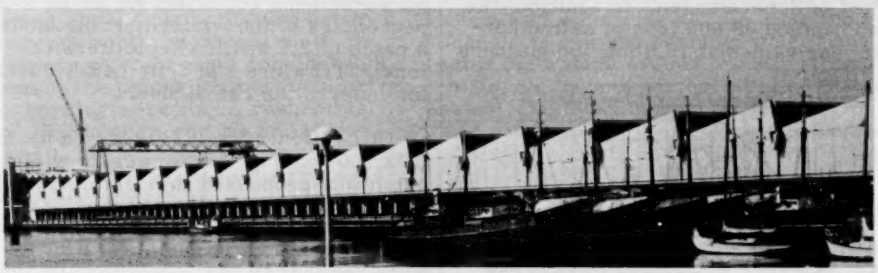
Netherlands

MODERN FISH AUCTION FACILITY AT SCHEVENINGEN:

The construction of a new fish auction facility at Scheveningen (The Hague) on the North Sea, Netherlands, at the northwest side of Scheveningen's first inner harbor, was started in September 1961. Measuring 262 x 1,312 feet, the complex will be the biggest and most modern fish auction facility in Europe, comprising the auction hall itself, a

Netherlands (Contd.):

service and administration building, and behind it, a rear site that can be used for storage.



The new fish auction hall along the first harbor at Scheveningen.

The auction hall is some 800 feet long, 85 feet wide, about 30 feet high, and can accommodate 10 modern trawlers moored alongside at one time, or space for 15 trawlers if moored alongside each other. The hall has a gross area capacity of nearly 75,000 square feet where 18,000 fish boxes can be placed. The service and administration building adjoins the auction hall's southwest side and contains several service rooms, the office of the Fish Auction Foundation, and the main offices of the Port and Market Authority. It also has a herring auction room that can accommodate 200 persons, and a large canteen for auction hall employees and visitors.

The roof of the building consists of 23 glass sections, each section measuring 46 x 85 feet placed in a slanting position and giving the impression of giant windows which are designed to diffuse from the northeast thus deflecting any heat caused by the sunlight. The total construction cost of the building is about $2.4 million.

All fish landed by fishermen at Dutch ports must be sold by auction whether catches are large or small, and buyers are obliged to buy fish only at the auctions. Thus, the fish auction site is considered a meeting place where fishermen, fishing vessel owners, and both the wholesale and retail trade meet almost every day--at a fixed location where the daily fish landings are sold by an impartial organization. In the Netherlands, both the wholesalers and retailers are permitted to attend fresh fish auctions, but only the wholesale trade is admitted to the salted herring auctions.

The establishment of the fish auction system in the Netherlands, and the compulsory sale of fish by auction, are designed as protective measures for the benefit of the fishing industry. All dealers must be officially registered before being admitted to the auction. By the auction system, fishermen can count on a fair price for their catch depending on supply, demand, and quality, and the dealers are guaranteed an adequate supply of fish.

In the Netherlands there is one State-owned fish auction facility at IJmuiden, north of Amsterdam. In addition there are many municipal and a few privately owned auctions, some of which are operated on a cooperative basis. In Scheveningen the auction is managed by what is known as the Fish Auction Foundation in which both the fish trade and municipal authorities have representation. Fresh fish, including fresh herring, auctioned there is sold by "word of mouth," which means that the auctioneer presides orally over the fish auction activities. Salted herring, however, are auctioned by using an electric push-button system and the stopping of a turning hand at a price indicator.

Before Scheveningen had a harbor of its own, the fish catches were sold on the beach. After the first harbor was dug in 1904, the fish were auctioned at the docks along the only inner harbor existing at the time. In later years, an auction hall for salted herring was built along that harbor. After the second harbor was dug in the 1930's, the auction site for fresh fish was established about 1935 in a hall opposite the slipway along the second inner harbor. Later, that auction hall proved to be totally inadequate because of the cramped facilities and small waterfront, especially after World War II when fish landings were greater and large trawlers were being used.

Netherlands (Contd.):

In 1963, a total of 35,000 metric tons of fresh fish (including herring) valued at 18.2 million guilders (US$5.1 million) was landed at the Port of Scheveningen. In addition, the Port also handled 36,000 tons of salted herring that year valued at 16.8 million guilders ($4.7 million).

Note: See Commercial Fisheries Review, March 1964 p. 38.

Norway

WINTER HERRING FISHERY, 1964:

Catch: The 1964 Norwegian fishery for winter herring (which includes spring herring) yielded a catch of about 3.1 million hectoliters or 288,300 metric tons (including 1.3 million hectoliters or 120,900 tons of winter herring and 1.8 million hectoliters or 167,400 tons of spring herring). That was the best result in the fishery since 1960 when 3.2 million hectoliters (297,600 tons) were taken. The comparable catch in 1963 totaled only 661,000 hectoliters (61,473 tons). In 1964, purse-seiners accounted for an unusually high percentage of the winter herring landings with a catch of 2.5 million hectoliters (232,500 tons). Trawlers and drift-netters accounted for most of the remainder.

Utilization: About 2.5 million hectoliters (232,500 tons) of the Norwegian winter herring catch was processed into fish meal and oil; 228,089 hectoliters (21,212 tons) were frozen for export; 186,490 hectoliters (17,344 tons) were salted; 72,344 hectoliters (6,728 tons) were canned; 49,411 hectoliters (4,595 tons) were iced for export; 26,872 hectoliters (2,499 tons) were used for bait; and 17,709 hectoliters (1,647 tons) were absorbed by the Norwegian domestic fresh market.

Purse-seining for herring on fishing grounds off west coast of Norway.

Norway (Contd.):

Prices: The 1964 winter herring catch yielded fishermen about 69.8 million kroner (US$9.8 million) including state subsidies. The catch was about equally divided between the northern and southern fishing districts, but the northern catch brought considerably lower prices. The prices for northern winter and spring herring were fixed, respectively, at 20.0 and 17.5 kroner per hectoliter (US$1.36 and 1.19 per hundred pounds). That was 26 to 30 percent less than the prices paid for similar herring from the southern fishing districts. Fishermen were disappointed by the price differential. They were also said to be dissatisfied with the high proportion of the catch that went for meal and oil. The newspaper Harstad Tidende has indicated that Feitsildfiskernes Salslag (sales organization of the fat herring fishermen) may be named as the new sales agent for herring caught in the northern area.

Capelin Fishery: In 1964, ex-vessel capelin prices were relatively high; capelin yielded fishermen 16.85 kroner per hectoliter ($1.15 per hundred pounds) before March 15, and 12.61 kroner per hectoliter ($0.86 per hundred pounds) after that date--including the subsidy of 3.75 kroner per hectoliter ($0.21 per hundred pounds). The capelin fishery in the winter of 1964 yielded a catch of 53,395 hectoliters (4,966 tons) before March 15, and 148,387 hectoliters (13,800 tons) after that date. (Fiskaren, July 1, 1964.)

Note: Norwegian kroner 7.16 equal US$1.00.

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AGREEMENT ON FISHING FOR DOGFISH AND BASKING SHARK SIGNED WITH GREAT BRITAIN:

A new agreement which permits Norwegian fishermen to fish for dogfish (Acantis vulgaris) and basking shark (Cethorinus maximus) in the waters surrounding northern Scotland and the Shetlands was signed by Norway and Great Britain on September 28, 1964, in London. Norwegians will have the right to fish within the new 12-mile limit around Great Britain until 1984, but will be excluded from fishing closer than 6 miles from shore after 1965. That region is to be reserved exclusively to Britons.

The right to fish for dogfish and basking shark in British coastal waters has traditionally been an important one for Norway. The new agreement reportedly will insure for Norwegian fishermen an estimated combined income of 250 million kroner (US$35.0 million) over the 20-year period. It will provide productive employment to Norwegian fishermen who might otherwise be idle after the great schools of cod and herring, which usually inhabit the waters around Norway from January to March, have departed. (United States Embassy, Oslo, October 4, 1964.)

Note: See Commercial Fisheries Review, September 1964 p. 88.

Persian Gulf

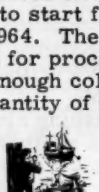
COMMERCIAL FISHERY IN SOUTHERN AREA TO BE DEVELOPED BY BRITISH FIRM:

Commercial fishing along a section of the Trucial Coast (the southern area of the Persian Gulf) is to be developed by a British fishing company of Grimsby in collaboration with interests at Beirut, Lebanon. The Trucial Coast (consisting of 7 sheikdoms) is a 350-mile coastal strip on the Arabian peninsula in the southwestern part of the Persian Gulf. The Beirut interests obtained the fishing concession from the ruling sheik at Ash Shariqah.

Persian Gulf (Contd.):

It is believed that the waters along the Trucial Coast abound in shrimp as well as other edible fish species. If shrimp are found in quantity and the enterprise is successful, it is anticipated that a large portion of the shrimp catch will be marketed in the United States. In making the announcement, the British fishing company said it is acting as adviser on all aspects of the fishing operations and will also be responsible for marketing the entire catch.

The first trawler purchased for the new enterprise was reported en route to the Trucial Coast and was to start fishing about the end of September 1964. The vessel has facilities and equipment for processing and freezing the catch, and enough cold-storage space for a substantial quantity of frozen fish and shellfish.



Philippines

SHRIMP EXPORTS, 1963:

Total shrimp (mostly frozen) exports by the Philippines in 1963 were valued at ₱537,000 (US$138,000), with most of those exports going to the United States market. The value of shrimp exported to the United States in 1963 was $113,000. The remainder of the shrimp exports with a value of $25,000 went to Japan.

The Philippine shrimp export business is relatively new and there are not more than four firms which export shrimp either on a regular basis or as specific orders are received. It is reported that there is no known local association of shrimp firms in the Philippines. (United States Embassy, Manila, September 25, 1964.)

Poland

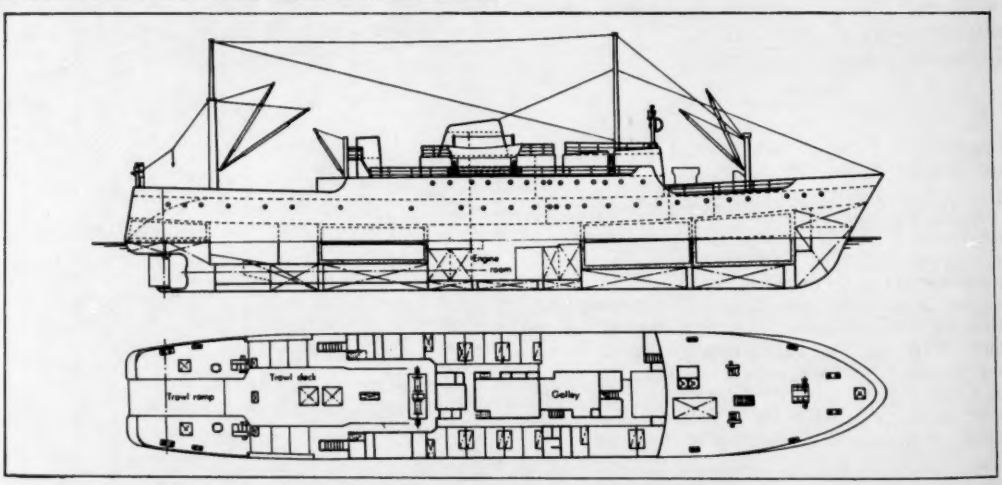
FISHERIES LANDINGS, JANUARY-JUNE 1964:

Polish landings of salt-water fish amounted to 112,708.4 metric tons in the first half

Polish Landings of Salt-Water Fish, January-June 1964 1/

Species	January-June 1964				Year 1963 Total
	State-Owned Enterprises	Cooperatives	Private Fishermen	Total	
	(Metric Tons)				
Salmon	0.3	85.1	44.1	129.5	331.3
Eel	-	10.3	57.7	68.0	154.5
Baltic herring	4,309.0	1,575.0	317.8	6,201.8	28,151.0
North Sea herring	21,273.6	-	-	21,273.6	73,275.8
Sprat	11,053.7	1,808.1	2,659.1	15,520.9	10,732.2
Cod	29,255.0	6,291.2	4,072.2	39,618.4	57,475.9
Flatfish	1,928.4	277.7	200.6	2,406.7	5,098.2
Mackerel	6,696.4	-	-	6,696.4	5,453.3
Ocean perch	11,388.2	-	-	11,388.2	13,023.3
Other salt-water fish 2/	8,063.6	26.7	215.0	8,305.3	13,532.7
Brackish-water fish	-	1,008.3	91.3	1,099.6	2,516.8
Total	93,968.2	11,082.4	7,657.8	112,708.4	209,744.9

1/Preliminary.
2/Includes catch off South Africa by state-owned enterprises.



Profile and layout of modern Polish stern trawler.

Poland (Contd.):

of 1964. Cod was the leading species landed, followed by North Sea herring, sprat, and ocean perch. (Polish Maritime News, No. 73.)

Note: See Commercial Fisheries Review, June 1964 p. 56.

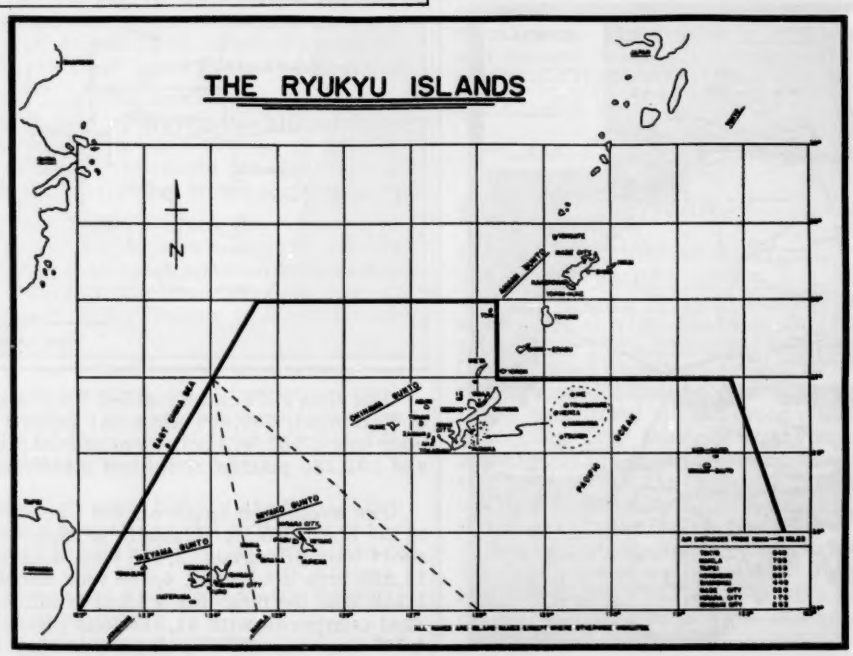
Portugal

CANNED FISH PACK, JANUARY-JUNE 1964:

Portugal's total pack of canned fish in oil or sauce in the first half of 1964 was up 146 percent from that in the same period in 1963. The increase was due mainly to a greatly expanded sardine pack. Portuguese sardine landings of 31,687 metric tons in January-June 1964 were up only slightly from the 30,262 metric tons landed in the first half of 1963, indicating the canneries received a larger percentage of the catch in 1964. (Conservas de Peixe, August 1964.)

Portuguese Canned Fish Pack, January-June 1963-64

Product	Jan.-June 1964		Jan.-June 1963	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	17,681	930	4,576	241
Chinchards	476	24	30	1
Mackerel	1,635	65	952	37
Tuna and tuna-like	2,176	72	1,943	64
Anchovy fillets	1,469	147	2,069	206
Others	357	19	85	4
Total	23,794	1,257	9,655	553



Ryukyu Islands

GOVERNMENT SEEKS CHANGES IN TUNA FISHERIES AGREEMENT WITH JAPAN:

The Economics Bureau, Government of Ryukyu, as of the latter part of September 1964, was studying revisions in the Japan-Ryukyu Agreement pertaining to the distant-water tuna fisheries. The Agreement, concluded in 1960, provided for the licensing of a total of 4,500 gross tons of tuna fishing vessels under Ryukyuan registry. The Ryukyuan Government is seeking at least a twofold increase in tuna vessel tonnage under a new agreement.

The Ryukyuan tuna fleet presently consists of 26 tuna vessels (operated by 13 firms) total-

Ryukyu Islands (Contd.):

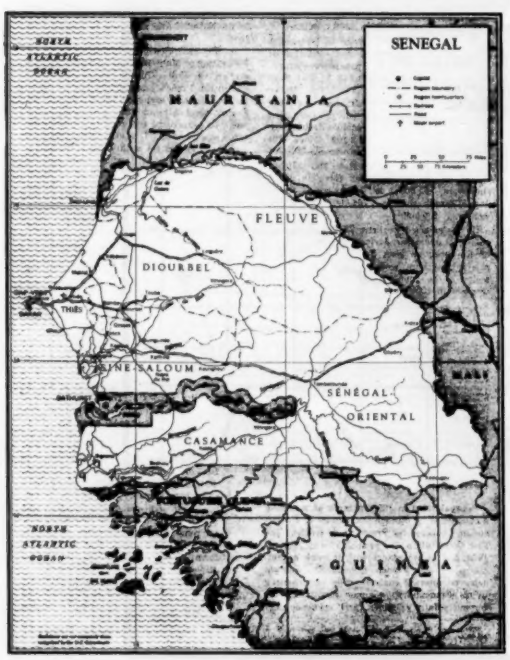
ing 5,564 gross tons. The fleet includes vessels totaling about 1,000 gross ton which were engaged in fishing prior to that Agreement and are therefore not covered by it. In 1963 the tuna fleet landed 17,538 metric tons of tuna and other species. (Suisan Keizai Shimbun, September 27, 1964.)

Senegal

SHRIMP FISHERY TRENDS, 1964:

Senegal's small but growing shrimp industry is expected to provide about 400 metric tons of shrimp for the French market in 1964.

The shrimp-processing plant at Ziguinchor in southern Senegal, which is controlled by French interests with headquarters in Dakar, started operating in May 1962 with a capital investment of $40,000 and a fleet of 50 artisan canoes (pirogues). Since that time, the working capital has been increased to $100,000 and the fleet of canoes has expanded to 300 craft.



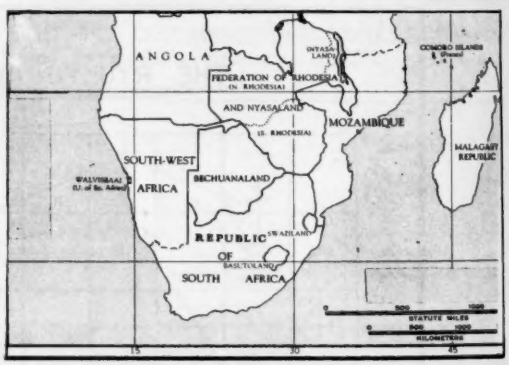
The six-months shrimp fishing season on the Casamance River is between May 15 and November 15. During that period, 150 fishermen are employed on a salary basis and 250 more fishermen employed under contract.

The French firm has recently expanded its plant facilities to include canning of oysters on an experimental basis. Canned oyster products include smoked oysters, oysters with chopped parsley and garlic, oysters with butter, and oysters in the natural form without any additives. The firm is reported interested in developing United States markets for those products. (Fisheries Attache, United States Embassy, Abidjan, September 16, 1964.)

South Africa Republic

PILCHARD-MAASBANKER FISHERY, MAY-JUNE 1964:

South Africa Republic: The shoal fish catch off the Cape west coast of South Africa Republic in June 1964 was 33,538 short tons pilchard, 549 tons maasbanker, and 6,345 tons anchovy, for a total of 40,432 tons. That compares with 77,966 tons pilchards and 322 tons maasbanker landed in June 1963.



The June 1964 catch yielded 9,904 short tons of fish meal, 600,605 imperial gallons of fish body oil, 2,582,592 pounds of canned pilchards, and 191,280 pounds of canned maasbanker.

The shoal fish catch off the Cape west coast of the South Africa Republic in May was 34,079 short tons pilchards, 2,006 tons maasbanker, 13,586 tons mackerel, 6,966 tons anchovy, and 2,218 tons herring, for a total of 58,855 tons. That compares with 61,012 tons pilchards and 4,787 tons maasbanker landed in May 1963.

South Africa Republic (Contd.):

(There were no mackerel, anchovy, or herring landings in May 1963.)

The May catch yielded 13,667 short tons of fish meal, 896,220 imperial gallons of fish body oil, 184,032 pounds of canned pilchards, 353,586 pounds of canned maasbanker, and 3,451,008 pounds of canned mackerel.

The Cape west coast shoal fish catch for the first 6 months of the 1964 season was 257,178 tons pilchards, 19,952 tons maasbanker, 55,319 tons mackerel, 16,947 tons anchovy, and 2,218 tons herring. The total catch was 351,614 tons. In the same period of 1963, the catch was 377,217 tons pilchards, 12,782 tons maasbanker and 14,634 tons mackerel. (There were no anchovy or herring landings in January-June 1963.)

South-West Africa: At Walvis Bay in South-West Africa, the pilchard catch amounted to 394,285 tons during January-June 1964.

The Walvis Bay pilchard industry has been taking full advantage of the higher oil yield of fish this season. In comparison with an average yield of 8 to 10 gallons per ton of fish last year, the fish oil yield this year has been averaging 25 to 28 gallons per ton of fish.

A few Walvis Bay factories expected to take their pilchard catch quota of 90,000 tons each by the end of August 1964; most of the others expect to take their catch quota by the end of October 1964.

An application by Walvis Bay pilchard processing factories for an increase of 60,000 tons in the 720,000-ton quota for 1964 has been refused by the South West Africa administration.

According to the Walvis Bay newspaper Namib Times, the industry made the application to enable it to meet additional market demands. The Administration, however, has said that the new anchovy fishery will provide additional supplies.

Each of the 7 factories at Walvis Bay has been allowed one anchovy purse-seine net, and there will be no restrictions imposed on the amount of anchovy which may be caught by the 7 vessels using those nets.

The new fish meal factory at Walvis Bay did not begin operating until mid-1964 and is not expected to attain its 90,000-ton pilchard quota until late in 1964. (The South African Shipping News and Fishing Industry Review, July and August 1964.)

South-West Africa

PILCHARD FISHING INDUSTRY TRENDS, FY 1963:

Heavy demand raised prices for South-West African fish meal in fiscal year 1963, according to the South West African Administration.

During the year ended March 31, 1964, a total of 600,000 short tons of pilchard was landed and processed at the 6 Walvis Bay factories of South-West Africa. That catch yielded about 150,000 tons of fish meal, which was sold for R11.4 million (US$16.0 million). The main market was the United Kingdom. The United States and Japan were also important buyers.

The total production of fish body oil from the 1963 pilchard catch was sold for R1.5 million ($2.1 million), entirely to the United Kingdom. (Editor's Note: Fish-body oil production from the 1963 pilchard catch was estimated at 4.5 million imperial gallons. The oil yield was below average.)

South-West African sales of canned pilchards in fiscal year 1963 amounted to R5.8 million ($8.1 million) as compared with sales of R12.1 million ($16.9 million) the previous fiscal year. The decline was due to price and demand fluctuations on the international market. (The South African Shipping News and Fishing Industry Review, July 1964.)

Spain

FISHERY TRENDS AT VIGO, JULY-SEPTEMBER 1964:

Landings and Prices: Fishery landings at the port of Vigo, Spain, in July-September 1964, while higher than the previous quarter (April-June) when they totaled 18,755 metric tons, were estimated to be about 20 percent lower than in the same period of 1963. The September 1964 landings of sardines are not included in the preliminary landings data for this quarter and the situation could change because sardine landings continued heavy into the early part of October. As of the end of September, the tuna (yellowfin) catch for the 1964 season was estimated to be about half that of the 1963 season, with ex-vessel prices higher than the previous year.

Spain (Contd.):

Fig. 1 - Wooden trawlers in Vigo's fishing port outfitted for tuna fishing. Long poles on left are used to drag lines alongside the vessel.

Canned Fish Industry: The canned fish industry worked at a much slower pace during the third quarter of 1964 than is normal during that time of the year. The poor catches of commercial varieties and the high prices at which offered contributed to that situation. Improvement was reported during the latter part of September and early October, and the reason for the recovery was a greater supply of fish, consisting mainly of sardines.

The recovery in canned fish exports reported for the second quarter of the year declined somewhat during the third quarter, with a decrease of about 15 percent both in quantity and in value. As compared with the third quarter of 1963, there was an increase of about 13 percent in quantity and of about 15 percent in value.

With the authorization on July 1, 1964, to export under certain conditions canned fish with peanut and other seed oils, fish canners expected that their sales abroad would increase. This apparently has not been the case, although the situation might improve in the near future as a result of that authorization. A further measure being sought by fish canners was an increase of the present 6 percent tax exemption on exports to levels ranging up to 17 percent. (United States Consulate, Vigo, October 16, 1964.)

Note: See Commercial Fisheries Review, October 1964 p. 78.

Taiwan

SHRIMP EXPORTS, JANUARY-JUNE 1964:

Five fishery firms in Taiwan exported a total of 360,526 pounds of shrimp valued at US$315,040 during the first six months of 1964. All of it went to Japan except for a very small quantity which was shipped to the United States. Two of the firms shipped about 125,000 pounds each during that period. Each of the other three firms shipped an average of about 40,000 pounds. One of the shrimp exporting companies is a United States firm established in Taiwan. (United States Embassy, Taipei, September 23, 1964.)

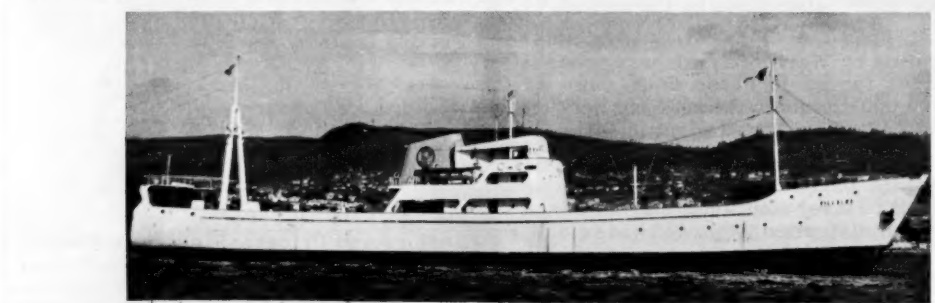


Fig. 2 - Spanish stern freezer trawler Villalba.

U.S.S.R.

STATE FISHERIES PRODUCTION COMMISSION RECOMMENDS DEEP-WATER TRAWLING FOR FISHING VESSELS:

The head of the fishing department of the Soviet State Fisheries Production Commission has recommended to all regional departments that they equip their vessels for deep-water trawling in 1964, according to a report in a

U.S.S.R. (Contd.):

Soviet periodical dated September 26, 1964. His recommendation was based on results obtained from studies conducted in the different sea areas on deep-dwelling species of fish and on the policy subsequently adopted by the Production Commission to develop a deep-water fishery. (Suisancho Nippo, September 10, 1964.)

United Kingdom

TWO NEW SEMIAUTOMATED STERN TRAWLERS OF "DARING" CLASS TO BE BUILT:

A shipyard at Selby, England, has orders to build two new stern trawlers along the revolutionary lines of the Ross Daring (launched May 1963) and her sistership Ross Delight (launched August 1963). Each of those semiautomated stern trawlers has a length overall of 99 feet, a range of about 30 days, and a fish-hold capacity for about 140,000 pounds of iced fish.

The semiautomated stern trawler Ross Daring.

The basic "Daring" design will be used by the Selby shipyard in building the two new stern trawlers. However, design information gained through extensive trials has been fed back to the shipyard and this, together with modifications made by the owners to the equipment on the trawlers in service, is being incorporated in the construction of the two new vessels. Work on the first of the new trawlers started in October 1964; it is scheduled for completion in April 1965.

The existing trawlers, Ross Daring and Ross Delight, are each worked by a crew of five men including the skipper. The automated design of the vessels provides an engineroom which operates unattended, requiring only periodic visits the whole time the trawler is at sea. Electronic controls for the machinery, and hydraulic controls for the winches enable each vessel to be handled, when trawling, by one man.

In 4 recent North Sea fishing trips totaling 32 days, the Ross Daring landed 826 kits (115,640 pounds) of fish which were sold at dockside for £5,699 (US$15,957).

Note: See Commercial Fisheries Review, September 1963 p. 92.

Yugoslavia

FISHERIES TRENDS, 1964:

Development Program, 1964-1970: The proposed fisheries development program in the Yugoslav 7-Year Economic Plan for 1964-1970 was approved by representatives of the country's fishing industry at a meeting at Fiume (Rijeka) early in 1964.

CATCH: The new 7-Year Economic Plan calls for the annual marine catch of Yugoslavia to increase sixfold over current levels and reach 120,000 metric tons by 1970, consisting of 80,000 tons from the ocean and 40,000 tons from the Adriatic Sea.

FISHING FLEET: The Plan also envisions a fishing fleet investment during 1964-1970 of approximately 53,000 million lire (US$85 million) to be used to build 160 vessels for Adriatic fishing, 40 for ocean fishing, and 6 for fish transport. An additional 2,000 million lire ($3 million) will be allocated to the lake and inland water fisheries of Yugoslavia. (La Pesca Italiana, April 1964.)

Tuna Fishing: In early 1964, a contract was announced between a shipyard and a fisheries firm in Yugoslavia for the construction of a series of large motor fishing vessels to be used for tuna fishing in the Atlantic. Those vessels, to be built at Pola (Pula), will be equipped to fish off the west coast of Africa; each vessel will have storage space for 450 tons of frozen fish. (ISEA, January 1964.)

Fish Meal: A Yugoslav fish-meal factory in Zadar began test production in mid-1964. Reports indicated the new factory would be

Yugoslavia (Contd.):

processing 20 tons of raw material daily by the end of September 1964. The annual production of the factory will be greater than that of all the other Yugoslav fish-meal factories combined. The new fish-meal factory is using raw materials that formally were thrown into the sea.

Four more fish-meal factories like the one at Zadar are planned. (Borba, Belgrade, September 18, 1964.)

Note: Italian lira 624.9 equal US$1.00.

SEA SCALLOPS--A YEAR-ROUND SHELLFISH FAVORITE

Sea scallops, considered as one of the tastiest foods from the deep, are plentiful and economical, and they are never out of season. The ocean variety of scallops is harvested and marketed year-around.

Scallops are active swimmers, moving freely through the waters of the sea. The active opening and closing of its shell, controlled by the adductor muscle, provides a form of water-jet locomotion for the scallop. The sweet, firm-meat adductor muscle, often called the "eye," is the part of the scallop which Americans so thoroughly enjoy.

The sea scallop is harvested from the deep waters off the North and Middle Atlantic States. The bulk of the catch of this delicious shellfish is landed at the old whaling port of New Bedford, Mass., which is known to many as "The Scallop Center of the World." The sea scallop shell is saucer-shaped and sometimes grows to a diameter of 8 inches.

Shoppers find that scallops as marketed are one of the best buys because they are 100 percent edible--no waste. Scallops are available in a variety of market forms including fresh, frozen, frozen breaded, frozen deep-fried, and in packaged frozen dinners. Scallop meats are lean, light, and firm; and contain the easily digested animal protein so necessary for body growth and repair. The scallop is also an excellent source of calcium, phosphorus, iron, copper, and iodine. It is characterized by an extremely low fat content.

The most familiar scallop main dishes are deep-fried or pan-fried. Scallops are also served in cocktails, appetizers, soups, casseroles, and salads with equally satisfying results. Delicious, never out of season, sea scallops provide delectable eating.

Home economists of the U. S. Bureau of Commercial Fisheries recommend the following recipe. Additional recipes are to be found in the recipe publication How to Cook Scallops. It is sold by the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402, for 25 cents a copy.

Scallops Amandine

2 pounds scallops, fresh or frozen
1 teaspoon salt
Dash pepper
½ cup flour
½ cup blanched slivered almonds
½ cup butter or margarine, melted
2 tablespoons chopped parsley
Toast points

Thaw frozen scallops. Rinse with cold water to remove any shell particles. Cut large scallops in half. Sprinkle scallops with salt and pepper. Roll in flour. Fry almonds in butter until lightly browned. Remove almonds. Add scallops and continue frying. When scallops are brown on one side, turn carefully and brown the other side. Cooking time approximately 4 to 6 minutes. Add parsley and almonds. Serve on toast points. Serves 6.

FEDERAL ACTIONS

Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

USE OF SODIUM NITRATE AND SODIUM NITRITE AS FOOD ADDITIVES IN SMOKED CURED SABLEFISH:

A request for permission to use sodium nitrate and sodium nitrite as preservatives and color fixatives in smoked cured sablefish is the subject of a petition to the U. S. Food and Drug Administration. Petition was filed by the Association of Smoked Fish Processors, Inc., New York City. Notice of the petition was published in the Federal Register, September 26, 1964.

The proposal is the issuance of amendments to sections of the Federal Food, Drug, and Cosmetic Act dealing with food additives to provide for the safe use of sodium nitrate and sodium nitrite as preservatives and color fixatives in smoked, cured sablefish, at levels not in excess of 0.05 percent sodium nitrate and 0.02 percent sodium nitrite in the finished product.

Note: See Commercial Fisheries Review, February 1962 p. 102.

* * * * *

ANNUAL CONFERENCE HIGHLIGHTS UNDERSTANDING OF U.S. PURE FOOD AND DRUG LAW:

The 8th Annual Conference, sponsored jointly by the Food and Drug Administration (FDA) of the U. S. Department of Health, Education, and Welfare and the Food Law Institute, was held on November 30, 1964. The purpose of the Conference was to promote understanding of and voluntary compliance with the Federal pure food and drug law.

Four food and drug workshop sessions scheduled for the meeting had as their theme "What Industry Needs from FDA for Better Compliance." A consumer panel had the theme "What the Public Wants in Consumer Education."

An innovation for the 8th Annual Conference was an exhibition of outstanding visual communications chosen by a special review committee from entries submitted by Government agencies and industry. They included outstanding motion pictures, filmstrips, and exhibits used to answer public interest in the integrity of foods, drugs, and cosmetics; to further good manufacturing and marketing practices, and to promote voluntary compliance.

The Conference featured a keynote address by Food and Drug Commissioner George P. Larrick, and a response from the president of the Food Law Institute. There were also addresses by other FDA officials and industry leaders.

The panel workshops were conducted by a moderator and 4 expert panelists--2 each from FDA and industry. In the food area, they included sections devoted to: (1) "Sanitation and Quality Control," moderated by the Director of FDA's Bureau of Scientific Standards and Evaluation; and (2) "Additives and Pesticides," moderated by an official of Atlas Chemical Industries. A workshop on consumer education was moderated by the Director of FDA's Division of Consumer Education. (Press release of U. S. Food and Drug Administration, Washington, D. C.)

Department of the Interior

FISH AND WILDLIFE SERVICE

DETERMINATION OF FISHERY FAILURE DUE TO RESOURCE DISASTER IN GREAT LAKES AREA:

In an announcement dated July 21, 1964, published in the July 25, 1964, Federal Regis-

ter, the Secretary of the Interior determined that the Great Lakes fishing industry, as well as processors and distributors of smoked fish from the Great Lakes, incurred substantial economic injury in October 1963 as a result of temporary loss of markets for smoked fish.

The Secretary stated that the circumstances constituted a commercial fishery failure due to a resource disaster within the meaning of section 4(b) of Public Law 88-309 (Commercial Fisheries Research and Development Act), and therefore, he authorized the use of funds appropriated under the new law to alleviate the serious situation in the Great Lakes area.

Public Law 88-309 was signed by the President on May 20, 1964. Section 4(b) of the new law provides that the Secretary of the Interior may make available up to $400,000 to aid a fishing industry when he determines that a commercial fishery failure due to a resource disaster has occurred.

The determination made by the Secretary of a commercial fishery failure due to a resource disaster in the Great Lakes area, as published in the Federal Register, July 25, 1964, follows:

DEPARTMENT OF THE INTERIOR

Office of the Secretary

GREAT LAKES AREA

Determination of Fishery Failure Due to Resource Disaster

Whereas, many firms are engaged in catching, processing and marketing fish from the Great Lakes area; and

Whereas, the Food and Drug Administration on October 25, 1963, issued a statement warning the public of botulism in smoked fish from the Great Lakes area; and this warning was followed by a drastic reduction in consumption resulting in substantial economic injury to the Great Lakes fishing industry and to processors and distributors of smoked fish from the Great Lakes area; and

Whereas, the cause of the botulism was not known; and

Whereas, Great Lakes chubs on hand at the time of this incident were either destroyed or preserved in freezers, with approximately 2 million pounds still in storage; and these fish, even though frozen, have deteriorated to the point where they cannot even be used for pet food; and the only use to which they can now be put is for reduction, that is, to produce fishmeal; and the value of the fishmeal will not pay for the processing and raw material transport costs;

Now, therefore, as Secretary of the Interior, I hereby determine that the foregoing circumstances constitute a commercial fishery failure due to a resource disaster within the meaning of section 4(b) of Public Law 88-309. Pursuant to this determination, I hereby authorize the use of funds appropriated under the above legislation as diversion payments to cause removal from the usual markets the stocks of chubs which are preventing normal trade operations and for such other measures as may be necessary to mitigate the damage.

STEWART L. UDALL,
Secretary of the Interior.

JULY 21, 1964.

Note: See Commercial Fisheries Review, Oct. 1964 pp. 25, 85; Sept. 1964 p. 100 Aug. 1964 p. 95.

* * * * *

REGULATIONS ON COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT PUBLISHED:

Final regulations setting up procedures to be used by the Secretary of the Interior in giving financial aid to state agencies for research and development of the commercial fisheries resources of the Nation were published in the October 3, 1964, Federal Register. Regulations became effective on the date of publication. They bring into effect the Commercial Fisheries and Development Act of 1964 (Public Law 88-309) passed by Congress this year and signed by President Johnson May 20, 1964. First, the new law provides for payment of $5 million annually to states for commercial fishery research and development over a five-year period. The states will be required to provide matching funds equal to at least 25 percent of project costs. However, Congress adjourned this year before it was able to appropriate funds to implement this part of the new law.

Second, the Act also authorizes the allocation of $400,000 annually for two years and $650,000 for each of the following three years to states where there is a commercial fishery failure resulting from natural or undetermined causes (under Section 4(b)). For the fiscal year ending June 30, 1965, Congress did appropriate $400,000 for that part of the Act. The Secretary of the Interior has already taken action to assist the Great Lakes area fishing industry recover from economic losses suffered in 1963. In subsequent years, such funds will be available to other segments of the industry suffering fishery failures arising from economic disasters. Regulations applying to Section 4(b) were published in the August 27, 1964, Federal Register.)

Third, the law authorizes the allocation of $100,000 a year to states for developing new commercial fisheries. No funds are yet available for this part.

Fourth, it provides for loan funds to Alaska's fishermen for charter of fishing vessels for temporary replacement pending the repair or permanent replacement of vessels lost or damaged in the March 27, 1964, Alaska earthquake disaster. Repayment of those loans is to be made only from the net profits of the operation of the chartered vessels after deducting a reasonable amount for the salary of the fishermen chartering the vessels. (Regulations covering this provision of the Act were published in the May 23, 1964, Federal Register.

A Notice of Proposed Rule Making was published in the Federal Register of July 10, 1964. Interested persons were given 30 days in which to submit written comments, suggestions, or objections to the proposed new part. Comments on Section 253.4 of 50 CFR Part 253 dealing with "Use of resource disaster funds" were to be submitted at an earlier date.

Comments have been received for all other sections of Part 253. Consideration was given to such comments and appropriate clarifying changes have been made.

The regulations covered by Part 253 are published complete (to include those regulations issued for just part of the Act) in

the Federal Register, October 3, 1964. The regulations include definitions, interpretation of the authorization, use of research and development funds, use of new commercial fishery funds, financial responsibility, reporting, record retention, audit and inspection, patents and inventions, etc.

The regulations as they appeared in the Federal Register follow:

Title 50—WILDLIFE AND FISHERIES

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBCHAPTER F—AID TO FISHERIES

PART 253—COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT

On Pages 9454 through 9456 of the FEDERAL REGISTER of July 10, 1964, there was published a notice and text of a proposed new Part 253 of Title 50, Code of Federal Regulations. The purpose of the new part was to provide for procedures to be used by the Secretary of the Interior in providing financial assistance to State Agencies for research and development of the commercial fisheries resources of the Nation and, in cooperation with State Agencies, directly to the commercial fisheries in cases where he has determined that there is a commercial fishery failure due to a resource disaster arising from natural or undetermined causes, or where he may prevent such a resource disaster.

Interested persons were given 30 days in which to submit written comments, suggestions, or objections with respect to the proposed new part; except, that comments with respect to § 253.4 *Use of resource disaster funds*, were required to be submitted to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington, D.C., 20240, within a period of 10 days.

In paragraph (a) *Determination*, of § 253.4 *Use of resource disaster funds*, it was noted the Secretary shall cause to be published in the FEDERAL REGISTER a notice of finding that a commercial fishery failure due to a resource disaster arising from natural or undetermined causes when such a finding is made. After such publication, resource disaster funds may be used for specified purposes with the cooperation of the respective State Agencies.

The FEDERAL REGISTER of July 25, 1964, included a notice of determination by the Secretary of the Interior that a commercial fishery failure due to a resource disaster within the meaning of section 4(b) of Public Law 88–309 existed in the Great Lakes fishing industry.

On August 27, 1964, there was published in the FEDERAL REGISTER § 253.4 *Use of resource disaster funds*, as a formal regulation. Comments have now been received for all other sections of Part 253. Consideration has been given to such comments and appropriate clarifying changes made in §§ 253.1 to 253.12, inclusive. These sections are hereby added to § 253.4, which has already been published as a regulation, and Part 253 is now published in its entirety.

Sec.
253.1 Definitions.
253.2 Interpretation of the authorization.
253.3 Use of research and development funds.
253.4 Use of resource disaster funds.
253.5 Use of new commercial fishery funds.
253.6 Financial responsibility.
253.7 Reporting.
253.8 Record retention.
253.9 Audit and inspection.
253.10 Officials not to benefit.
253.11 Patents and inventions.
253.12 Convict labor.

AUTHORITY: The provisions of this part 253 issued under sec. 8, Public Law 88–309.

§ 253.1 Definitions.

As used in this part, terms shall have the meaning ascribed in this section.

(a) *Secretary.* The Secretary of the Interior or his authorized representative.

(b) *Act.* Public Law 88–309, Commercial Fisheries Research and Development Act of 1964.

(c) *Research and development funds.* Funds, the appropriation of which, were authorized by subsection 4(a) of the Act.

(d) *Resource disaster funds.* Funds, the appropriation of which, were authorized by subsection 4(b) of the Act.

(e) *New commercial fishery funds.* Funds, the appropriation of which, were authorized by subsection 4(c) of the Act.

(f) *Person.* Individual, association, partnership or corporation, any one or all as the context requires.

(g) *Primary producer or commercial fisherman.* A person owning, having a beneficial interest in, managing, or operating a vessel or gear engaged in harvesting raw fish for commercial purposes.

(h) *Net profits.* The net profit, before taxes, as computed in accordance with generally accepted accounting standards with due regard to the practices in the locality in which the fishing operation is conducted.

(i) *Reasonable amount as determined by the Secretary for the salary of the fisherman.* A computed amount equal to the average income of the applicant from fishing operations during the 3 preceding calendar years, with a maximum of $3,000, computed from applicant's income tax returns for those years.

(j) *Contractor.* A person, agency or institution performing services, under contract with the State Agency, in carrying out the provisions of a project agreement.

(k) *Commercial fisheries resources.* Stocks of raw fish available or potentially available for harvesting with the primary intent of moving the product into channels of commercial trade.

§ 253.2 Interpretation of the authorization.

The terms used in the Act to describe the authorization to the Secretary are construed to be limited to the meanings ascribed in this section.

(a) Supplement, and, to the extent practicable, increase the amounts of State funds. The words "supplement, and, to the extent practicable, increase the amounts of State funds" mean that State funds, to be used for at least 25 percent of the cost of a project financed with research and development funds, will be additional funds provided for that project and will not represent funds diverted from some other commercial fishery project except that during fiscal years 1965 and 1966, the fact that a State Legislature did not meet after approval of this Act will be considered evidence that it is not practicable for the State Agency to furnish funds that have not been previously used for other commercial fishery projects.

(b) Resource disaster arising from natural or undetermined causes. The words "resource disaster arising from natural or undetermined causes" mean a serious disruption of a fishery caused by alteration of habitat affecting present and future productivity, inability to catch the raw fish, or inability to sell the catch, because of a natural or undetermined cause. It does not include inability to sell the catch because of competition from imported or other competitive products.

(c) Developing a new commercial fishery. The words "developing a new commercial fishery" mean the development of a fishery for species of fish not common to the commercial fishery in the State in which the development is anticipated, or on stocks of fish not then being utilized commercially.

(d) Manufactured or processed fishery merchandise. The words "manufactured or processed fishery merchandise" mean fishery products which are included in the tables entitled Manufactured Fishery Products appearing in the annual Bureau of Commercial Fisheries Statistical Digests, Fishery Statistics of the United States. Data on new products, or the collection of statistics on products not formerly covered in these tabulations, will only be included in the subsequent year's determination of the apportionments.

§ 253.3 Use of research and development funds.

(a) *Apportionment and obligation.* On July 1 of each year, or as soon thereafter as practicable, the Secretary shall certify to the respective State agencies and the Secretary of the Treasury the amount of the respective apportionments of funds appropriated pursuant to section 4(a) of the Act. The Governor of each State shall notify the Secretary which agency of the State government is the agency authorized under its laws to regulate commercial fisheries and a duly authorized official of the State shall certify as to the duly appointed official authorized in accordance with State law to commit the State to participation under the provision of the Act, to sign project documents, and to receive payments. Each interstate agency shall provide similar certification prior to participation in the program. The Secretary shall be advised promptly of any change made in such authorizations. No funds may be obligated until aforesaid certification has been received. Proposed projects may be submitted at any time after the apportionment is made, but must be submitted at least 120 days prior to the end of the fiscal year following the year in which the apportionment to be charged was made. Notice of obligation of the funds will be furnished the applicable State agency as soon as possible after approval of the project by the Secretary.

(b) *Preliminary project statement.* A preliminary project statement shall be submitted for each proposed project which shall contain such fundamental information as the Secretary may require, in order to determine if the project should be approved. The preliminary project statement shall include plans, specifications, duration, experimental design, personnel and cost estimates, as well as the source of funding.

(c) *Project agreement.* After the Secretary shall have approved a preliminary project statement, mutual obligations to be undertaken by the cooperating agencies shall be evidenced by a project agreement to be executed between the State agency and the Secretary for each such project.

(d) *Prosecution of work.* (1) The State Agency shall carry all approved projects through to a stage of completion acceptable to the Secretary with reasonable promptness. Failure to render satisfactory progress reports or failure to complete the project to the satisfaction of the Secretary shall be cause for the Secretary to withhold further payments until the project provisions are satisfactorily met. Projects may be terminated upon determination by the Secretary that satisfactory progress has not been maintained. The Secretary shall have the right to inspect and review work being done at any time.

(2) Research and/or development work shall be continuously coordinated by the State Agency with studies conducted by other State and non-State Agencies in order to avoid unnecessary duplication.

(3) All work shall be performed in accordance with applicable State laws, except when contradictory to Federal laws or regulations, in which case Federal law or regulations will prevail.

(e) *Economy and efficiency.* No project shall be approved until the State has shown to the satisfaction of the Secretary that appropriate and adequate means shall be employed to achieve economy and efficiency in the completion of the project.

(f) *Contracts.* Supply, service, equipment and construction contracts involving an expenditure of $2,500 or more entered into by a State Agency for the execution of approved project activities shall be based upon free and open competitive bids. If a contract is awarded to other than the lowest responsible bidder, the payment of the Federal portion of the cost of the project shall be based on the lowest responsible bid, unless it is satisfactorily shown that it was advantageous to the project to accept a higher bid. Upon request, the State Agency shall certify and promptly furnish to the Secretary a copy of each contract executed and copies of all bids received concerning the contract.

(g) *Form of vouchers.* Vouchers on forms provided by the Secretary and certified as therein prescribed, showing amounts expended on each project and the Federal portion claimed to be due on account thereof shall be submitted to the Secretary by the State Agency either after completion of each project or as the work progresses.

(h) *Safety and accident prevention.* In the performance of each project, the State shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation. The State shall be responsible that all safeguards, safety devices, and protective equipment are provided and will take other needed actions reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of work on the project.

(i) *Personnel.* The State agency or the contractor shall maintain an adequate and competent force of employees to initiate and carry approved projects through to satisfactory completion. Personnel employed on approved projects by the State Agency shall be selected on the basis of their competence to perform the services required and shall conduct their duties in a manner acceptable to the Secretary.

(j) *Nondiscrimination.* Each project agreement shall contain the applicable sections of Executive Order No. 10925, dated March 6, 1961, as amended, pertaining to nondiscrimination and shall also be subject to Public Law 88–352 and any regulations promulgated thereunder.

§ 253.4 Use of resource disaster funds.

(a) *Determination.* The Secretary shall cause to be published in the FEDERAL REGISTER a notice of finding that a commercial fishery failure due to a resource disaster arising from natural or undetermined causes exists at the time such a finding is made. After such publication, resource disaster funds may be used for the following purposes with the cooperation of the respective State Agencies:

(1) Payments causing the removal from the usual markets of stocks of fish or shellfish of the species listed in the said finding which are preventing normal trade operations. No payments will be made under this paragraph unless the Secretary deems such action necessary to aid in restoring normal trade operations; the person receiving such payment, if not the primary producer, provides evidence that he has reimbursed the primary producer, or such other person from whom the raw fish was purchased; the person receiving such payments has furnished the Secretary with such information regarding purchases, costs, sales, etc., as the Secretary may require; and satisfactory evidence of removal of the products from channels of distribution, including storage, shall be provided to the Secretary. No payments may be made for any product which was removed from storage or other channels of distribution prior to the approval of this Act.

(2) Payments to primary producers of the species of fish listed in the said finding to assist them in obtaining gear or equipment necessary to operate in the same or a different fishery than that affected by the said resource disaster. No payments will be made under this paragraph unless the Secretary deems such action necessary to aid in restoring primary producers adversely affected by the said commercial fishery failure to a condition where they can operate profitably; the person receiving such payments furnishes the Secretary with such information regarding catches, sales and costs as the Secretary may require; and the person receiving such payments agrees to operate the gear purchased with the assistance of such payment in a manner satisfactory to the Secretary.

(3) Short-term loans for operating expenses of primary producers. When loans are made under this paragraph, the interest rate shall be 3 percent and repayment will be required only from net profits of the fishing operation, which net profit shall be reduced by such reasonable amount as determined by the Secretary for the salary of the fisherman. No such loans will be made unless the Secretary deems such action necessary to aid in restoring primary producers adversely affected by the said commercial fishery failure to a condition that will permit them to resume operations; the funds are not otherwise available on reasonable terms; and the past earning and credit record of the applicant is such that it provides reasonable assurance of repayment.

(4) Payments to State Agencies for projects directly related to the restoration of the fishery affected by the said resource disaster or to prevent a similar failure of the fishery in the future. Such preliminary project proposals and their processing will be subject to all regulations relating thereto in this Part, except that these projects will be given preference over other proposed projects with reference to the use of funds obtained under subsection 4(b) of the Act, and Federal funds may be used for 100 percent of the cost of the project if all of the funds are obtained from appropriations authorized under subsection 4(b) of the Act.

(b) *Non-determination.* At any time when there is no finding of a commercial fishery failure as described in subsection (a) of this section, the Secretary may, if he deems such action to be in furtherance of the purposes of the Act, approved preliminary project proposals for funding under subsection 4(b) of the Act from funds carried over from previous fiscal years; provided however, that no preliminary project proposal from any State will be funded under this subsection until that State has had all of its available apportioned funds, if any, obtained from appropriations authorized under subsection 4(a) of the Act, obligated.

§ 253.5 Use of new commercial fishery funds.

Preliminary project proposals leading to the establishment of a new commercial fishery may be approved for funding under this section when the Secretary finds that the proposal, if approved and carried out, will reasonably assure the establishment of a new commercial fishery within the State submitting the proposal. All proposals under this section will be subject to all applicable regulations of this Part, except that 100 percent of the project costs may be paid from Federal funds and, if the Secretary deems that the proposal will further the purposes of the Act, these proposals may be approved without the requirement that the State submitting the proposal first have obligated all of its apportioned funds, if any.

§ 253.6 Financial responsibility.

(a) State Agencies are required to account for each approved project. Cost accounting records, consistent with generally accepted accounting standards, shall be maintained for each project separately.

(b) State Agencies are responsible for the financial management of the project.

Appropriate internal controls will, therefore, be adopted and installed to insure that the project is accomplished in the most efficient and economical manner.

§ 253.7 Reporting.

(a) Quarterly progress reports on approved projects will be furnished by State Agencies. These reports will be compiled on forms approved by the Secretary. Progress payments or other disbursements will not be made unless reporting requirements are met.

(b) Completion reports, on forms approved by the Secretary, are required when the project is completed pursuant to the project agreement. Final progress payments to State Agencies on individual projects will not be made until a completion report has been rendered and accepted by the Secretary. Completion reports with respect to research and development projects will contain a certification that the State Agency has contributed at least 25 percent of the total project cost.

(c) A mutual release will be executed by the State Agency and the Secretary, or his authorized representative, when both parties have fulfilled their respective obligations under the agreement or contract.

(d) Copies of audit reports on audits of projects made by State auditors or inspectors shall be furnished the Secretary and will not be returned to State Agencies.

§ 253.8 Record retention.

(a) All records of accounts, reporting and supporting documentation thereto will be retained by the State or State Agency for a period of 3 years after the project is completed.

(b) Loan applicants, to whom a loan has been granted pursuant to section 9 of Public Law 88-309 or § 253.4(a)(3), shall retain all records incident to the fishing operation for a period of 3 years after the Note has been satisfied.

§ 253.9 Audit and inspection.

(a) Authorized representatives of the Department of the Interior and the United States General Accounting Office shall have the right to audit, examine or inspect accounts, books, documents and other pertinent records involving operations and transactions under the regulations in this part.

(b) State Agencies are expected to provide for a system of periodic internal review or audit by State employees.

(c) Periodic audits will be performed on projects with State Agencies and other operations provided for in Public Law 88-309 by authorized representatives of the United States Government. Audits may be performed on active projects and within 3 years after the project is completed.

(d) Audit exceptions involving adjustments in payment to any State Agency on any project, whether active or completed, may be applied to other approved projects or to applicable apportionments of funds to State Agencies.

§ 253.10 Officials not to benefit.

No member of or delegate to Congress or resident commissioner, shall be admitted to any share or any part of an agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

§ 253.11 Patents and inventions.

Determination of the patent rights in any inventions or discoveries made in the course of or under any research and development contract entered into pursuant to the Act shall be governed by the Statement of Government Patent Policy promulgated by the President in his memorandum of October 10, 1963 (3 CFR 1963 Supp. p. 238, 28 F.R. 10943).

§ 253.12 Convict labor.

In connection with the performance of work, the State Agency agrees not to employ any person undergoing sentence of imprisonment at hard labor.

This amendment shall become effective on the date of publication in the FEDERAL REGISTER.

JOHN M. KELLY,
Acting Secretary of the Interior.

OCTOBER 1, 1964.

Note: See Commercial Fisheries Review, October 1964 pp. 25, 85; September 1964 p. 100; August 1964 p. 95.

* * * * *

PROPOSED REGULATIONS FOR FISHING VESSEL CONSTRUCTION ASSISTANCE ANNOUNCED:

Proposed regulations to govern the operation of a new program (United States Fishing Fleet Improvement Act--Public Law 88-498) to encourage construction of fishing vessels in United States shipyards were announced by the U. S. Department of the Interior on October 8, 1964, and published in that day's Federal Register.

The United States Fishing Fleet Improvement Act provides for payment, under certain conditions, of the difference between building a vessel in United States shipyards and in less expensive foreign shipyards, with a maximum payment of 50 percent of the United States cost. The legislation was signed by President Johnson August 30, 1964. It authorized the appropriation of $10 million annually for the program. Just before adjourning, Congress voted a $2.5 million appropriation to operate the program for the current Fiscal Year (July 1, 1964 - June 30, 1965).

To be eligible, a vessel must be "of advance design," as further defined in the proposed regulations, but must not cause economic hardship to efficient vessel operations already working in the same fishery. An applicant must possess the ability, experience, resources and other qualifications necessary to operate and maintain the new vessel. A hearing is to be held on each application.

Under the proposed rules, the vessel must be a modern one which will upgrade the fleet, and special consideration will be given vessels which will provide a significant contribution in helping the domestic fishery meet foreign competition.

Notice of Proposed Rule Making as published in the Federal Register, October 8, 1964, follows:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Part 256]

FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY PROCEDURES

Notice of Proposed Rule Making

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by the Act of June 12, 1960 (P.L. 86-516; 46 U.S.C. 1401-1413), as amended, it is proposed to revise 50 CFR Part 256 as set forth below. The purpose of the revision is to incorporate

those changes necessitated by the enactment of the United States Fishing Fleet Improvement Act (P.L. 88-498) which was approved on August 30, 1964. This Act amended the Act of June 12, 1960, by extending the date for receipt of applications and changed the eligibility requirements as well as increasing the maximum amount of the subsidy which can be paid. Due to the numerous changes being proposed, the procedures will be more readily understood if the entire part is revised.

This proposed regulation relates to matters which are exempt from the rule making requirements of the Administrative Procedure Act (5 U.S.C. 1003); however, it is the policy of the Department of the Interior that, whenever practicable, the rule making requirements be observed voluntarily. Accordingly, interested persons may submit in triplicate written comments, suggestions, or objections with respect to the proposed amendments to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington, D.C., 20240, within 30 days of the date of publication of this notice in the FEDERAL REGISTER.

Part 256 reads as follows:

Sec.
256.1 Basis and purpose.
256.2 Definitions.
256.3 Eligibility requirements.
256.4 Applications.
256.5 Notice and hearing.
256.6 Subsidy contract.
256.7 Vessel operations.
256.8 Penalties.
256.9 Inspection of vessels.
256.10 Payment of subsidy.

AUTHORITY: The provisions of this Part 256 issued under sec. 10, P.L. 86-516, as amended.

§ 256.1 Basis and purpose.

(a) The Act of June 12, 1960 (P.L. 86-516), as amended and hereinafter referred to as the Act, authorizes the Secretary of the Interior to pay a subsidy for the construction of fishing vessels in shipyards of the United States.

(b) The purpose of this part is to prescribe rules and regulations governing the payment of these subsidies.

§ 256.2 Definitions.

(a) *Secretary.* The Secretary of the Interior or his authorized representative.

(b) *Administrator.* The Maritime Administrator in the Department of Commerce or his authorized representative.

(c) *Person.* Individual, association, partnership or corporation, or any one or all as the context requires.

(d) *Fishery.* A segment of the commercial fishing industry engaged in the catching of a single species or a group of species of fish and shellfish. To be considered as operating in a fishery, the catch of species in that fishery must amount to at least fifty-one percent (51%) (at the option of the owner by ex-vessel weight or ex-vessel value) of the total catch of the vessel during the calendar year.

(e) *Expanded areas.* Fishing grounds not usually fished by the majority of the vessels operating in the fishery for which the proposed vessel is designed.

(f) *Newly developed gear.* The most modern gear available that is suitable for use in the fishery for which the proposed vessel is designed.

§ 256.3 Eligibility requirements.

(a) Vessel will be of advance design: In order to be considered to be of advance design, the vessel must be designed to have significant advantages in utility and efficiency over a significant number of vessels engaged in the fishery in which the proposed vessel is designed to operate.

(b) No economic hardship to efficient vessel operators: The determination that operation of a proposed vessel will not cause economic hardship to efficient vessel operators already operating in that fishery shall be made by the Secretary after notice and hearing, taking into consideration the condition of the resource, the efficiency of the vessels and gear being operated in that fishery compared with the proposed vessel, the prospects of the market for the species caught, and the degree and duration of any anticipated economic hardship.

(c) Aid in the development of the United States fisheries: For the vessel to aid in the development of the United States fisheries under conditions that the Secretary considers to be in the public interest, the vessel must be a modern vessel which will upgrade the fleet. Special consideration will be given to vessels which will provide a significant contribution in helping the domestic fishery meet foreign competition.

(d) The applicant possesses the ability, experience, resources and other qualifications necessary to enable him to operate and maintain the proposed new fishing vessel. In making this determination, the Secretary will inquire into the economic feasibility of the fishing venture and will require reasonable assurance that the applicant can operate the vessel profitably.

§ 256.4 Applications.

Applications for a subsidy shall be made on forms prescribed by the Secretary and shall be filed with the Director, Bureau of Commercial Fisheries, Washington, D.C. The applications must be accompanied by three copies of the cross section, deck arrangement, outboard profile, and specifications of the proposed vessel. The Secretary may require such additional complete detailed construction plans as may be necessary after a review of the application and accompanying plans and specifications.

§ 256.5 Notice and hearing.

After receipt of an application eligible on its face for a construction differential subsidy the Secretary will publish a Notice of Hearing on a Subsidy Application in the FEDERAL REGISTER and hold hearings in accordance therewith. The purpose of the hearing will be to provide any person who feels he will be economically injured by the construction of the proposed vessel to cross-examine witnesses and/or present evidence that the operation of such vessel will cause economic hardship to efficient vessel operators already operating in the fishery for which the vessel is designed. Hearing procedures will be held in accordance with Part 257 of this subchapter.

§ 256.6 Subsidy contract.

(a) A contract for the payment of the subsidy will take effect when all contracts between the applicant for such subsidy and the shipbuilder, who is to construct such vessel, have been approved by the Administrator and the subsidy contract has been signed by the Secretary and the applicant; and

(b) The contract shall contain a finding of the useful life of the vessel as determined by the Secretary to be used in computing the amount of the total depreciated construction subsidy to be repaid to the Secretary in accordance with section 9 of the Act.

§ 256.7 Vessel operations.

(a) If the owner of a fishing vessel constructed with the aid of a subsidy desires to operate it in a different fishery than the one for which it was designed because of an actual decline in that particular fishery, he shall submit an application to the Secretary for permission to transfer the operations of the vessel to a different fishery. The application shall contain data showing the decline in the fishery for which the vessel was designed, how this decline is making the operation of the vessel uneconomical or less economical, and why the transfer will not cause economic hardship or injury to efficient vessel operators already operating in the fishery to which he wishes to transfer operations.

(b) Upon receipt of such an application the Secretary will publish a Notice of Hearing on an Application to Change Fishery in the FEDERAL REGISTER and hold hearings in accordance therewith. The purpose of the hearings will be to provide any person who feels he will be economically injured by said transfer of fishing operations an opportunity to cross-examine witnesses and/or present evidence that such a transfer of operations will cause economic hardship or injury to efficient vessel operators already operating in the fishery to which the vessel's operations would be transferred. Hearing procedures will be held in accordance with Part 257 of this subchapter.

§ 256.8 Penalties.

In case the Secretary shall find that a vessel has operated contrary to the provisions of the Act or of regulations issued thereunder, he shall immediately notify the owner in writing of the specific acts involved and the amount of the penalty. The vessel owner may appeal such a finding to the Secretary in writing within 30 days of the date of mailing such finding to the last known address of the vessel owner. The amount of penalty assessed in any one year shall be equal to the total subsidy paid multiplied by the ratio that one year bears to the total number of years determined, by the Secretary, as the useful life of the vessel: *Provided, however,* That if this amount is not paid within 60 days after receipt of notice then the amount due shall be the total amount of the subsidy paid depreciated to the beginning of the year in which the vessel operated unlawfully. Any amount due hereunder shall constitute a maritime lien against the vessel effective at the time the Secretary determines that the vessel has operated in violation of the Act or regulations.

§ 256.9 Inspection of vessels.

The Secretary or the Administrator shall have access at all times to all vessels which are being constructed under a contract providing for a construction subsidy provided for by the Act.

§ 256.10 Payment of subsidy.

The subsidy will be paid to the applicant after the vessel is completed and evidence of full payment to the shipyard constructing the vessel is presented; or jointly to the applicant and the shipyard upon completion and delivery of the vessel.

ROBERT M. PAUL,
Deputy Assistant Secretary of the Interior.

OCTOBER 2, 1964.

* * * * *

PROPOSED REGULATIONS ANNOUNCED FOR NOTICE AND HEARING REQUIREMENTS OF FISHING FLEET IMPROVEMENT ACT:

Proposed regulations to provide procedures for notice and hearing requirements of the United States Fishing Fleet Improvement Act (Public Law 88-498) were announced by the U. S. Department of the Interior and published in the Federal Register, October 29, 1964. The Act, as amended, requires a notice and hearing on certain phases of each application for a fishing vessel construction subsidy and for permission for a vessel to change fisheries when such vessel has been constructed with the aid of the subsidy.

The proposed regulations on procedures for notice and hearing requirements include: basis and purpose; definitions; scope of rules; authentication; inspection of records; appearance and practice; form, execution and service of documents; notice, pleadings and replies; hearing procedure; evidence; and decisions.

Interested persons were given until November 17, 1964, to submit written comments, suggestions, or objections on the proposed regulations to the Director, Bureau of Commercial Fisheries.

The regulations as they appeared in the Federal Register follow:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Part 257]

RULES OF PRACTICE AND PROCEDURE FOR NOTICE AND HEARING ON SUBSIDIES

Notice of Proposed Rule Making

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by the Act of June 12, 1960 (Public Law 86-516; 46 U.S.C. 1401-1413), as amended, it is proposed to adopt 50 CFR Part 257 as set forth below. The purpose of these regulations is to provide procedures for notice and hearing requirements of the United States Fishing Fleet Improvement Act (Public Law 88-498) which was approved August 30, 1964. This Act amended the Act of June 12, 1960, and requires a notice and hearing on certain phases of each application for a subsidy and for permission for a vessel to change fisheries when such vessel has been constructed with the aid of this subsidy.

This proposed regulation relates to matters which are exempt from the rule making requirements of the Administrative Procedure Act (5 U.S.C. 1003); however, it is the policy of the Department of the Interior that, whenever practicable, the rule making requirements be observed voluntarily. Accordingly, interested persons may submit written comments, suggestions, or objections with respect to the proposed amendments to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington, D.C., 20240, within 20 days of the date of publication of this notice in the FEDERAL REGISTER.

Sec.

257.1 Basis and purpose.
257.2 Definitions.
257.3 Scope of rules.
257.4 Mailing address.
257.5 Authentication.
257.6 Inspection of records.
257.7 Appearance and practice.
257.8 Parties.
257.9 Form, execution and service of documents.
257.10 Notice, pleadings and replies.
257.11 Duties of Presiding Officer.
257.12 Hearing procedure.
257.13 Evidence.
257.14 The record.
257.15 Decisions.

AUTHORITY: The provisions of this Part 257 issued under the Act of June 12, 1960 (Public Law 86-516), as amended.

§ 257.1 Basis and purpose.

(a) The Act of June 12, 1960 (Public Law 86-516), as amended by the United States Fishing Fleet Improvement Act (Public Law 88-498) authorizes the Secretary of the Interior to pay a subsidy for the construction of fishing vessels in shipyards of the United States and requires that this be done only after Notice and Hearing.

(b) The purpose of this part is to establish rules of practice and procedure for the notice and hearing.

§ 257.2 Definitions.

Definitions shall be the same as in Part 256 of this subchapter.

§ 257.3 Scope of rules.

The regulations in this part govern the procedure in hearings subject to Part 256 of this subchapter. These hearings are subject to the Administrative Procedure Act (5 U.S.C. 1003, et seq.) and Practice Before The Department of the Interior (43 CFR Part 1). The regulations shall be construed to secure the just, speedy, and inexpensive determination of every proceeding with full protection for the rights of all parties therein.

§ 257.4 Mailing address.

Documents required to be filed in, and correspondence relating to, proceedings governed by the regulations in this part shall be addressed to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington, D.C., 20240.

§ 257.5 Authentication.

All rules, orders, determinations, and decisions of the Secretary shall be signed by the Secretary.

§ 257.6 Inspection of records.

The files and records of these hearings, except those held by the Secretary for good cause to be confidential, shall be open to inspection and copying as follows:

(a) All pleadings, motions, depositions, correspondence, exhibits, transcripts of testimony, exceptions, briefs, and decisions in any formal proceeding under this part may be inspected and copied in the office of the Chief, Branch of Loans and Grants, Bureau of Commercial Fisheries, Department of the Interior, Washington, D.C., 20240.

(b) Orders, rules, rulings, opinions, determinations, and decisions may be inspected in the office of the Chief, Branch of Loans and Grants, except those held by the Secretary for good cause to be confidential and not cited as precedents.

§ 257.7 Appearance and practice.

(a) A party may appear in person or by an officer, partner or regular employee of the party; by or with counsel or as otherwise permitted by 43 CFR Part 1 in any proceeding under the regulations in this part. A party may offer testimony, produce and examine witnesses, and be heard upon brief and at oral argument if oral argument is granted by the Presiding Officer. Attorneys-at-law who are admitted to practice before the Federal Courts or before the courts of any State or possession of the United States, may represent a party as counsel.

(b) Persons who appear at any hearing shall deliver a written notice of appearance to the official reporter, stating for whom the appearance is being made. The Presiding Officer may require a person making an appearance in a representative capacity to show his authority to act in such capacity. The written appearance shall be made a part of the record.

§ 257.8 Parties.

(a) The term "party" shall include any natural person, corporation, association, firm, partnership, trustee, receiver, cooperative or governmental agency determined by the Presiding Officer as having an interest in the proceedings. A party making an application shall be designated as "applicant." A party whose petition for leave to intervene is granted shall be designated an "intervenor." Only a party as designated in this section may introduce evidence or examine witnesses at hearings.

(b) For an intervenor to prove an interest in the hearings he must show that there is a reason for belief that the operation of the vessel described in the application will cause economic injury or hardship to efficient vessel operators already operating in the fishery in which it is proposed that the vessel be operated.

§ 257.9 Form, execution and service of documents.

(a) All papers to be filed under the regulations in this part shall be clear and legible; and shall be dated, signed in ink, contain the docket description and title of the proceeding and the title, if any, and the address of the signatory. Five copies of all papers are required to be filed. Documents filed shall be executed by (1) the person or persons filing same, (2) by an authorized officer thereof if it be a corporation or, (3) by an attorney or other person having authority with respect thereto.

(b) All documents, when filed, shall show that service has been made upon all parties to the proceeding. Such service shall be made by delivering one copy to each party in person or by mailing by first class mail, properly addressed with postage prepaid. When a party has appeared by attorney or other representative, service on such attorney or other representative will be deemed service upon the party. The date of service of document shall be the day when the matter served is deposited in the United States mail, shown by the postmark thereon, or is delivered in person, as the case may be.

(c) The original of every document filed under this part and required to be served upon all parties to a proceeding shall be accompanied by a certificate of service signed by the party making service, stating that such service has been made upon each party to the proceeding. Certificates of service may be in substantially the following form:

I hereby certify that I have this day served the foregoing document upon all parties of record in this proceeding by: (1) Mailing postage prepaid, (2) delivering in person, a copy to each party.

Dated at ---------- this ------ day of ---------- 19--.

Signature ----------

§ 257.10 Notice, pleadings and replies.

(a) After acceptance of an application eligible on its face for construction subsidy or for the transfer of a vessel to a different fishery, the Director, Bureau of Commercial Fisheries, shall publish a notice of hearing in the FEDERAL REGISTER advising that a hearing will be held not less than 30 days after date of such publication and setting the time and place and providing details with respect to such hearing. Any person desiring to intervene and present evidence that the approval of the application will cause economic injury or hardship to efficient vessel operators must file, at least 10 days prior to the date set for the hearing (unless otherwise consented to by the Presiding Officer), a Petition of Intervention setting forth his interest. The hearing will be held in Washington, D.C., unless such a petition is received. If such a petition is received, the Presiding Officer may designate a different hearing site by telegraphic notice to the parties in the proceedings. If no petition to intervene is received, it will not be necessary for the applicant to appear at the hearing if he files all information in writing as required by the Presiding Officer.

(b) All petitions shall be in writing and shall state the petitioner's grounds of interest in the subject matter; the facts relied upon, the relief sought; and shall cite the authority upon which the petition rests. The petition shall be served upon all parties named therein or affected thereby. Answers to petitions must be filed within 5 days of the hearing date, unless otherwise consented to by the Presiding Officer.

(c) Amendments or supplements to pleadings may be allowed or refused in the discretion of the Presiding Officer. The Presiding Officer may direct a party to state its case more fully and in more detail by way of amendment. If a response to an amended pleading is necessary, it may be filed and served within the time set by the Presiding Officer. Amendments or supplements allowed prior to hearing will be served in the same manner as the original pleading.

(d) All motions and requests for rulings shall state the relief sought, the authority relied upon and the facts alleged. If made before or after the hearing, such motions shall be in writing. If made at the hearing, motions may be stated orally: *Provided, however,* that the Presiding Officer may require such motion to be reduced to writing and filed and served in the same manner as a formal motion. Oral argument upon a written motion, in which an answer has been filed, may be granted within the discretion of the Presiding Officer. Answers to a formal motion or pleading shall be filed and served in the same manner as the motion or pleading.

§ 257.11 Duties of Presiding Officer.

The Presiding Officer shall have the authority and duty to:

(a) Take or cause depositions to be taken.

(b) Rule upon proposed amendments or supplements to motions and pleadings.

(c) Regulate the course of the hearings.

(d) Prescribe the order in which evidence shall be presented.

(e) Dispose of procedural requests or similar matters.

(f) Hear and initially rule upon all motions and petitions before him.

(g) Administer oaths and affirmations.

(h) Examine witnesses.

(i) Rule upon offers of proof and receive competent, relevant, material, reliable, and probative evidence.

(j) Exclude irrelevant, immaterial, incompetent, unreliable, repetitious or cumulative evidence.

(k) Exclude cross-examination which is primarily intended to elicit self-serving declarations in favor of the witness.

(l) Limit cross-examination to interrogatories which are required for a full and true disclosure of the facts in issue.

(m) Act upon petitions to intervene.

(n) Act upon submissions of facts or arguments.

(o) Hear arguments at the close of testimony.

(p) Fix the time for filing briefs, motions and other documents to be filed in connection with hearings.

(q) Issue the intial decisions and dispose of any other pertinent matter that normally and properly arises in the course of proceedings.

§ 257.12 Hearing procedure.

(a) Unless authorized by the Presiding Officer, witnesses will not be permitted to read prepared testimony into the record. The evidentiary record shall be limited to factual and expert opinion testimony. Arguments will not be received in evidence but should be presented in opening and/or closing statements or in briefs to the Presiding Officer. All exhibits and responses to requests for evidence shall be numbered consecutively by the party submitting same and shall be filed with the Presiding Officer if filed during the hearing. If filed at some other time they should be filed in accord-

ance with § 257.4 with one copy also being sent to each party to the hearing.

(b) Normally, the order of presentation at the hearing will be alphabetical in each of the following categories:

(1) Applicant,

(2) Intervenors.

Rebuttal should be presented without any adjournment in the proceedings.

(c) Cross-examination shall be limited, subject to § 257.13(b), to the scope of the direct examination and to witnesses whose testimony is adverse to the party desiring to cross-examine. Only cross-examination which is necessary to test the truth and completeness of the direct testimony and exhibits will be permitted.

(d) A request for oral argument at the close of testimony will be granted or denied by the Presiding Officer in his discretion.

(e) Rulings of the Presiding Officer may not be appealed prior to, or during, the course of the hearings, except in extraordinary circumstances where prompt decision by the Secretary is necessary to prevent unusual delay or expense, in which instance the matter shall be referred forthwith to the Secretary by the Presiding Officer. Any appeal shall be filed within 10 days from the date of the close of the hearing.

§ 257.13 Evidence.

(a) In any proceedings under this part, all evidence which is relevant, material, reliable and probative, and not unduly repetitious or cumulative, shall be admissible. Irrelevant and immaterial or unduly repetitious evidence shall be excluded.

(b) Each party shall have the right to present his case or defense by oral or documentary evidence, to submit rebuttal evidence; and to conduct such cross-examination as may be required for a full and true disclosure of the facts.

(c) At any time during the hearing the Presiding Officer may call for the production of further relevant and material evidence, reports, studies and analyses upon any issue, and require such evidence to be presented by the party or parties concerned, either at the hearing or adjournment thereof. Such material shall be received subject to appropriate motions, cross-examination and/or rebuttal. If a witness refuses to testify or produce the evidence as requested, the Presiding Officer shall forthwith report such refusal to the Secretary.

§ 257.14 The record.

(a) The Director, Bureau of Commercial Fisheries, will designate an official reporter for all hearings. The official transcript of testimony taken, together with any exhibits and briefs filed therewith, shall be filed with the Director, Bureau of Commercial Fisheries. Transcripts of testimony will be available in any proceeding under the regulations of this part, and will be supplied by the official reporter to the parties and to the public, except when required for good cause to be held confidential, at rates fixed by the contract between the United States of America and the reporter. If the reporter is an employee of the Department of the Interior, the rate will be fixed by the Director, Bureau of Commercial Fisheries.

(b) The transcript of testimony and exhibits, together with all papers and requests, including rulings and the initial decision filed in the proceeding, shall constitute the exclusive record for decision. The initial decision will be predicated on this same record, as will the final decision.

§ 257.15 Decisions.

(a) The Presiding Officer is delegated the authority to render initial decisions in all proceedings before him. The same officer who presides at the reception of evidence shall render the initial decision except when such officer becomes unavailable to the Department of the Interior. In such case, another Presiding Officer will be designated by the Secretary to render the initial decision. Briefs, or other documents, to be submitted after the hearing must be received not later than ten (10) days after the hearing unless otherwise extended by the Presiding Officer upon motion by a party. The initial decision shall be made within twenty (20) days after the hearing or the receipt of all briefs, whichever is later. If no appeals from the initial decision are received within ten (10) days of the date of the initial decision, it will become the final decision on the twentieth day following the date of the initial decision. If an appeal is received, the appeal will be transmitted to the Secretary who will render the final decision after considering the record and the appeal.

(b) All initial and final decisions, shall include a statement of findings and conclusions, as well as the reasons or basis therefor, upon the material issues presented. A copy of each decision shall be served on the parties to the proceeding, and furnished to interested persons upon request.

(c) Official notice may be taken of such matters as might be judicially noticed by the courts; or of technical or scientific facts within the general or specialized knowledge of the Department of the Interior as an expert body; or of a document required to be filed with or published by a duly constituted Government body: *Provided*, That where a decision or part thereof rests on the official notice of a material fact not appearing in the evidence of the record, the fact of official notice shall be so stated in the decision and any party, on timely request, shall be afforded an opportunity to show the contrary.

FRANK P. BRIGGS,
Assistant Secretary of the Interior.

OCTOBER 26, 1964.

Small Business Administration

LOANS TO NEW ENGLAND COMMERCIAL FISHERIES FIRMS IN SEPTEMBER 1964:

Approval of 2 commercial fisheries loans in September 1964 was announced October 6, 1964, by the Boston Regional Office of the Small Business Administration (SBA).

A $15,000 direct loan to run 6 years at 4 percent interest was made to Plymouth Packing Co., Inc., Plymouth, Mass. The firm has been established to process and distribute precooked frozen stuffed lobster. The loan funds were for machinery and equipment ($3,800), inventory ($5,000), packaging supplies ($3,200), and working capital ($3,000).

A $2,000 direct loan was made to Frank L. Howard, Jr., Portsmouth, N. H., who operates a restaurant and lobster fishing business.

* * * * *

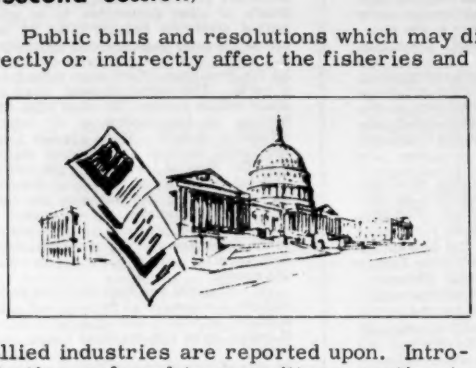
DISASTER LOANS FOR HURRICANE-DAMAGED AREAS:

The Small Business Administration (SBA) has authorized disaster loan assistance in those areas of Florida, Georgia, Alabama, Mississippi, and Louisiana damaged by the recent hurricanes and accompanying tornadoes. Disaster loans at 3 percent interest and terms up to 20 years are available to help restore businesses and homes suffering storm damage. Field agents of the Small Business Administration should be contacted for additional information.

Eighty-Eighth Congress

(Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and



allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

AGRICULTURAL DEPARTMENT APPROPRIATIONS: Agricultural Appropriations for 1965, Hearings before the Subcommittee of the Committee on Appropriations, United States Senate, 88th Congress, 2nd Session, on H.R. 11202, making Appropriations for the Department of Agriculture and the Farm Credit Administration for the fiscal year ending June 30, 1965, and for other purposes, 1,415 pp., printed; Volume II, Farmers Home Administration, Rural Electrification Administration, Testimony of Members of Congress, Organizations and Individuals, Reports to the Committee from Department of Agriculture, 868 pp., illus., printed. Hearings began March 10, 1964, and were completed July 22, 1964. Contents consist of Departmental testimony justifying the request for funds. Included are statements and testimony on the Agriculture Market News Service and its new services.

CHEMICAL PESTICIDES COORDINATION: Interagency Coordination in Environmental Hazards (Pesticides), Hearings before the Subcommittee on Reorganization and International Organizations of the Committee on Government Operations, United States Senate, 88th Congress, 1st Session, Agency Coordination Study (Pursuant to S. Res. 27, 88th Cong., as amended). Coordination of Activities Relating to the Use of Pesticides, Part 1 (including exhibits), May 16, 22, 23, June 4, 25, 1963; Part 2 (including exhibits), July 17, 1963; Part 3 (including exhibits) July 18 and 23, 1963; Part 4 (including exhibits), Aug. 20 and 21, 1963; 1,059 pp., illus., printed. Included are testimonies and exhibits submitted by various Federal and state officials, Senators, doctors, associations, and representatives of business firms. The Subcommittee examined interagency coordination in environmental hazards and the role of the Federal Government as it deals with man's contamination of his environment. The Chairman pointed out that contamination comes from many sources and has many effects--in air, water, soil, crops, food, wildlife, and human beings. One consequence of this chemical age in which we live is the hazard to the environment created by use of chemical poisons to control insects and other pests, eliminate undesired vegetation, and prevent the infection of plants and animals--including man--by disease organisms. The use of chemical poisons is widespread and growing. The National Academy of Sciences estimates that since World War II the production of pesticides, including herbicides, fungicides, and insecticides has reached a total of approximately 1 billion pounds annually or about 6 pounds per person. The chemicals have a great potential for good and for harm. The purpose of the hearings was to find out just what the problem is, how much we know about it, and don't know, and what the Government, industry, and the public are doing about it. Of special concern is the extent to which the various Federal agencies interested in the problem coordinate their activities, exchange information, and administer their various programs of research, use, and regulation in an efficient and economical manner.

FISH PROTEIN CONCENTRATE: Fish Protein Concentrate, Hearing before the Subcommittee on Merchant Marine and Fisheries of the Committee on Commerce, United States Senate, 88th Congress, 2nd session on Federal Government's research program on fish protein concentrate, Aug. 14, 1964, Serial No. 60, 130 pp., illus., printed. Contents include statements and letters of various Federal officials, Senators, and Sport Fishing Institute. The Committee pointed out that for some 3 years now the U.S. Bureau of Commercial Fisheries has been carrying on research aimed at the development of a concentrate from fish which would provide an inexpensive yet protein-rich supplement. In fiscal 1962 Congress appropriated $50,000 for preliminary research efforts. The project has gotten under way on a larger scale during the last 2 years with annual appropriations of approximately $450,000. With those funds, the Bureau is carrying on extensive experiments in its laboratories in College Park, Md. Various processes and reagents are being tested. Nutrition studies are also being carried out. Other studies have been let out on contract by the Bureau. The Chairman stated that the purpose of the hearing was to bring the Congress and the public up to date on the progress that is being made. The development of an inexpensive protein supplement could enrich the diets of people around the world--some 2 million of whom suffer from a protein deficiency. The Chairman also said that they hoped in the course of the hearing to learn what standards a marketable concentrate would have to meet, how the products the Bureau has developed stand in relation to those standards, and how expensive or difficult they would be to produce. When time permits the scheduling of a more extensive hearing is planned, according to the Chairman.

HAWAIIAN ISLANDS: H. Doc. 353, Coasts of the Hawaiian Islands, Letter from the Secretary of the Army, transmitting a letter from the Chief of Engineers, Department of the Army, Dated May 15, 1964, Submitting a Report, Together with Accompanying Papers and Illustrations, on an Interim Survey of the Coasts of the Hawaiian Islands, Authorized by the River and Harbor Act Approved May 17, 1950; referred to Committee on Public Works, House of Representatives, 88th Congress, 2nd Session, Aug. 19, 1964, 119 pp., illus., printed. Contains favorable report from the Army Chief of Engineers, of harbors for light-draft vessels at eight harbor sites in Hawaii. Besides the report of the district engineer (giving the authority, description of harbors, and economic analysis, results of investigation, and recommendations), it contains comments from various Federal agencies, State of Hawaii, and reports from Chief of Engineers and Board of Engineers for Rivers and Harbors. One section of the report deals with Hawaii's commercial fishing industry and discusses (1) scale of industry and fish catch; (2) fishing boats and type of op-

erations; and (3) future growth of fishing industry. Several appendixes appear, including design and cost estimate; benefits; economic base study of the State of Hawaii; coordination with other agencies; and summary of public hearings.

INDIAN FISHING RIGHTS: Indian Fishing Rights, Hearings before the Subcommittee on Indian Affairs of the Committee on Interior and Insular Affairs, United States Senate, 88th Congress, 2nd Session, on S. J. Res. 170 and S. J. Res. 171 (Joint resolutions regarding Indian fishing rights), Aug. 5-6, 1964, 251 pp., printed. Contents include texts and departmental reports (Interior, Justice) on both bills; statements and communications of Indian Tribes, Federal and state officials, and associations; affidavits of noted biologists and fisheries experts; U.S. Supreme Court case citations; commercial landings of spring, summer and fall chinook and sockeye salmon and steelhead trout, 1951-63; Indian tribal ordinances, fishing regulations, and resolutions; steelhead catch in 1962; Washington State Supreme Court and Superior Court discussions and opinions. S. J. Res. 170 would authorize states to enact and to enforce laws of a purely regulatory nature concerning the time and manner of fishing outside an Indian Reservation that are for the purpose of conservation of fish, and that are equally applicable to Indians and all other citizens without distinction; and that legislation enacted pursuant to this law is declared to be in furtherance of and not in derogation of the treaties involved. S. J. Res. 171 would provide for the acquisition by the Secretary of the Interior of the Indian treaty rights.

TRADE AGREEMENTS PROGRAM: H. Doc. 366, Eighth Annual Report of the President of the United States on the Trade Agreements Program, Message from the President of the United States, transmitting, The Eighth Annual Report on the Operation of the Trade Agreements Program, in Accordance with Section 402 (a) of the Trade Expansion Act of 1962; referred to the Committee on Ways and Means, House of Representatives, 88th Congress, 2nd Session, Sept. 23, 1964, 27 pp., printed. This report lists the important advantages to the United States of expanding international trade in 1963. Discusses the United States and world trade in perspective; the new organizational arrangements of the trade agreements program under the Trade Expansion Act; the trade agreements program and the GATT; progress in 1963 on removal of foreign restrictions against United States exports; the revised tariff schedules; cases under the escape clause provisions; and resolution on trade negotiations adopted at the GATT ministerial meeting, May 16-21, 1963, Geneva.

PRESIDENT LAUDS SAN PEDRO FISHERMEN'S FIESTA

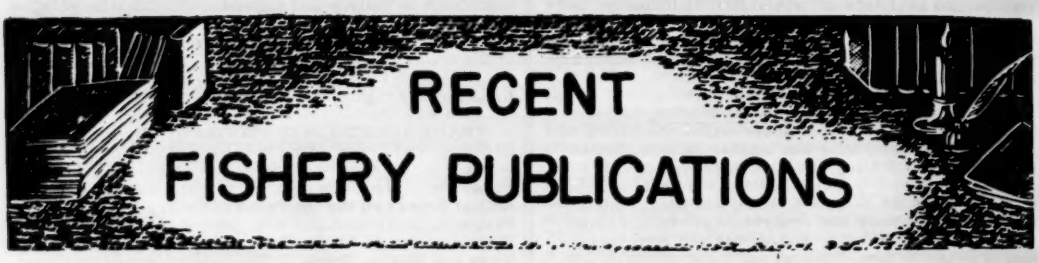
In 1964, San Pedro (Calif.) held its 14th annual Fishermen's Fiesta, October 23-25. A telegraph message from President Johnson read:

"I am delighted to extend to all who participate in the San Pedro Fishermen's Fiesta my good wishes for a successful festival.

"Few ways of life can boast the hardy traditions of the fisherman. Fishing is America's oldest occupation and one which continues to assume a vital role in the lives of our citzens.

"Your city has throughout its eventful life been one of our nation's foremost fishing ports. This enviable reputation brings just pride and distinction to the people of San Pedro which serves as a truly fitting place for a tribute to America's fishermen.

"I wish to express my warm appreciation to the men and women of San Pedro and to all Americans who strive to preserve the honor and dignity of the work of the fishermen. (Also see cover legend.)



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number Title

CFS-3144 - Canned Fishery Products, 1962 Annual Summary (Revised), 17 pp.
CFS-3157 - Industrial Fishery Products, 1962 Annual Summary (Revised), 9 pp.
CFS-3536 - Virginia Landings, 1963 Annual Summary, 11 pp.
CFS-3565 - Gulf Coast Shrimp Data, February 1964, 16 pp.
CFS-3569 - Florida Landings, May 1964, 8 pp.
CFS-3570 - Maine Landings, June 1964, 4 pp.
CFS-3571 - Frozen Fishery Products, July 1964, 8 pp.
CFS-3575 - Massachusetts Landings, February 1964, 9 pp.
CFS-3577 - Michigan Landings, May 1964, 3 pp.
CFS-3578 - Massachusetts Landings, March 1964, 9 pp.
CFS-3579 - Virginia Landings, May 1964, 4 pp.
CFS-3580 - Maryland Landings, June 1964, 4 pp.
CFS-3581 - Texas Landings, January 1964, 2 pp.
CFS-3582 - Texas Landings, February 1964, 2 pp.
CFS-3585 - Mississippi Landings, January 1964, 2 pp.
CFS-3587 - New York Landings, June 1964, 5 pp.
CFS-3588 - North Carolina Landings, July 1964, 4 pp.
CFS-3591 - Mississippi Landings, February 1964, 2 pp.
CFS-3592 - Mississippi Landings, March 1964, 2 pp.
CFS-3593 - Mississippi Landings, April 1964, 2 pp.
CFS-3594 - Mississippi Landings, May 1964, 2 pp.
CFS-3595 - Louisiana Landings, June 1964, 3 pp.
CFS-3596 - Rhode Island Landings, April 1964, 3 pp.
CFS-3597 - Ohio Landings, May 1964, 3 pp.
CFS-3598 - Shrimp Landings, May 1964, 5 pp.
CFS-3599 - Gulf Coast Shrimp Data, May 1964, 24 pp.
CFS-3603 - California Landings, June 1964, 4 pp.
CFS-3605 - Florida Landings, June 1964, 8 pp.
CFS-3606 - Fish Meal and Oil, July 1964, 2 pp.
CFS-3609 - Mississippi Landings, June 1964, 3 pp.
CFS-3610 - Alabama Landings, January 1964, 2 pp.
CFS-3611 - Alabama Landings, February 1964, 2 pp.
CFS-3612 - Alabama Landings, March 1964, 3 pp.
CFS-3615 - Alabama Landings, June 1964, 3 pp.
CFS-3619 - Georgia Landings, March 1964, 2 pp.
CFS-3620 - Georgia Landings, April 1964, 2 pp.
CFS-3633 - Alabama Landings, July 1964, 3 pp.

Sep. No. 712 - Preliminary Report on Experimental Smoking of Chub (Leucichthys sp.).

Sep. No. 713 - Age Composition of the Commercial California Bluefin Tuna Catch in 1963.

SSR-Fish. No. 446 - Age and Size Composition of the Menhaden Catch Along the Atlantic Coast of the United States, 1958, with a Brief Review of the Commercial Fishery, by Fred C. June and William R. Nicholson, 44 pp., illus., May 1964.

SSR-Fish. No. 478 - Age and Size Composition of the Menhaden Catch along the Atlantic Coast of the United States, 1959, with a Brief Review of the Commercial Fishery, by William R. Nicholson and Joseph R. Higham, Jr., 37 pp., illus., July 1964. There were 705,000 tons of Atlantic menhaden (Brevoortia tyrannus) caught during the 1959 purse seine fishery with 614,000 tons taken during the summer fishery and 91,000 tons during the North Carolina fall fishery. This was the second largest catch in the period 1955-59. The number of purse-seine sets (33,099) also reached a record in the same 5-year period. The mean catch per set (21 tons) was the same as in 1958, when the smallest catch (551,000 tons) in 5 years was taken. The near-record catch was primarily the result of 2 exceptionally large year-classes. The 1958 year-class (age-1 fish) constituted 91 percent of the catch in the South Atlantic Area, 90 percent in the Chesapeake Bay Area, and 58 percent in the Middle Atlantic Area. The 1956 year-class accounted for 58 percent of the catch in the North Atlantic Area and 58 percent in the North Carolina fall fishery. Mean length and weight of age-1 fish in all areas was the smallest in 5 years.

Annual Report of the Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Mass. for Fiscal Year Ending June 30, 1962, by Joseph W. Slavin, Circular 182, 21 pp., illus., August 1964. The Laboratory located in the fishing port of Gloucester, Mass., one of six operated by the Bureau of Commercial Fisheries, specializes in investigations on improving the quality of those fish and shellfish indigenous to the North Atlantic area of the country. Major fisheries of that region include groundfish, sea herring, lobsters, sea scallops, oysters, and clams. The report discusses research on the chemistry and biochemistry of fish, radiation-pasteurization research, preservation and processing research, standards and specifications research, and inspection and certification of fishery products. Included are publications by Laboratory personnel and a list of papers presented at meetings.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE FISHERY MARKET NEWS SERVICE, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 510, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number	Title
MNL-22	Republic of South Africa and Territory of South West Africa Fisheries, 1963 (Supplement), 8 pp.
MNL-56	Norwegian Fisheries, 1963, 8 pp.
MNL-75	Argentina's Fishing Industry, 1963, 6 pp.
MNL-81	France's Fishing Industry, 1963, 12 pp.
MNL-82	Fisheries of Ecuador, 1962-1963 and First Quarter 1964, 13 pp.
MNL-90	Belgian Fishing Industry, 1963, 32 pp.
MNL-91	Fisheries of Malaya, 1962-63, 23 pp.
MNL-92	Greenland's Fisheries during 1963, and 1964 Trends, 58 pp.

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE PUBLICATION IS AVAILABLE ONLY FROM THE BIOLOGICAL LABORATORY, U. S. BUREAU OF COMMERCIAL FISHERIES, 2725 MONTLAKE BLVD. E., SEATTLE, WASH. 98102.

Outline for a Fishery Economics Program, Translation Series No. 38, 10 pp., processed September 1963. (Translated from the Japanese, Fisheries Agency, Tokyo, Japan.)

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE ICHTHYOLOGICAL LABORATORY, BUREAU OF COMMERCIAL FISHERIES, U. S. NATIONAL MUSEUM, WASHINGTON, D. C. 20560.

Development of the Sense Organs of the Lateral Life Line System of the Perch and Ruff, by N. N. Disler, 66 pp., processed. (Translated from the Russian, Trudy Instituta Morfologii Zhivotnykh Imeni A. N. Severtsova, vol. 2, 1950, pp. 85-139.)

Geographical Distribution of Bathypelagic Fishes of the Family Nyctophidae in the Pacific Ocean, by Theodor S. Rass, 9 pp., processed. (Translated from the Russian, Trudy Instituta Okeanologii, Akademii Nauk, vol. 41, 1960, pp. 146-152.)

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE ONLY FROM THE REGIONAL OFFICE, U. S. BUREAU OF COMMERCIAL FISHERIES, 101 SEASIDE AVE., TERMINAL ISLAND, CALIF. 90731.

Comments on Van Cleve and Johnson's Paper on the "Management of the High Seas Fisheries of the Northeastern Pacific," 21 pp., processed, October 1964. (Translated from the Japanese, Northern Waters Resources Research Council of Japan, Tokyo, Japan, September 1964, 31 pp.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Baltimore) Monthly Summary--Fishery Products, May and June 1964, 8 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 103 S. Gay St., Baltimore, Md. 21202.) Receipts of fresh- and salt-water fish and shellfish at Baltimore by species and by states and provinces; total receipts by species and comparisons with previous periods; and wholesale prices for fresh fishery products on the Baltimore market; for the months indicated.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, August 1964, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, August and September 1964, 15 and 8 pp., respectively, illus. (U. S. Bureau of Commercial Fisheries, Biological Laboratory, P. O. Box 6121, Pt. Loma Station, San Diego Calif. 92100.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the months indicated.

(Chicago) Monthly Summary of Chicago's Wholesale Market Fresh and Frozen Fishery Products Receipts, Prices, and Trends, July 1964, 17 pp. (Market News Service, U. S. Fish and Wildlife Service, U. S. Customs House, 610 S. Canal St., Rm. 1014, Chicago, Ill. 60607.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and weekly wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, August 1964, 11 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market fishery imports at Port Isabel and Brownsville, Texas, from Mexico; Gulf menhaden landings and production of meal, solubles, and oil; and sponge sales; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland. August and September 1964, 4 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the months indicated.

New England Fisheries--Monthly Summary, August 1964, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary, July 1964, 18 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York, N. Y. 10038.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

Rampart Canyon Dam and Reservoir Project, Yukon River, Alaska, 122 pp., printed, 1964. (U. S. Fish and Wildlife Service, Subport Bldg., Juneau, Alaska 99801.)

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, September 1964, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels as reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

THE FOLLOWING SERVICE PUBLICATION IS FOR SALE AND IS AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

Outdoor Fish Cookery, Circular 189, 10 pp., July 1964, to be purchased in quantity at $35 for the first 1,000 and $18 for each additional 1,000. A folder containing recipes for outdoor preparation of a variety of fish and shellfish including bacon-wrapped smelt, scallop kabobs; and Louisiana shrimp boil, and peppy seafood sauce. Also offers tips on starting an outdoor fire, how to achieve a smoky flavor in the fish, and how to purchase fish portions.

"Photographing otoliths and scales," by Robert K. Brigham and Albert C. Jensen, article, The Progressive Fish-Culturist, vol. 26, no. 3, July 1964, pp. 131-135, illus., processed, single copy 25 cents.

Pondweeds and Pondweedlike Plants of Eastern North America, by Neil Hotchkiss, Circular 187, 30 pp., 25 cents, July 1964.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ACCLIMATIZATION:
"Akklimatizatsiya ryb v vodoemakh Sovetskovo Soyuza" (Acclimatization of fish in waters of the Soviet Union), by A. Isaev, article, Rybovodstvo i Rybolovtvo, vol. 6, no. 2, 1963, pp. 7-10, illus., printed in Russian. Rybovodstvo i Rybolovstvo, Orlikov pereulok 1/11, Moscow, I-139, U. S. S. R.

AFRICA:
Directory of Fisheries Institutions in Africa, processed, March 1964. FAO Regional Fisheries Officer for Africa, P. O. Box 1268, Accra, Ghana.

ALGAE:
"Chemistry of diatomic algae (Diatomeae)," by G. K. Barashkov, article, 15 pp., processed, 1963. (Translated from the Russian, Botanicheakiy Zhurnal, Akademiya Nauk SSSR, vol. 45, no. 9, 1960, pp. 1350-1356.) Translation Division, Foreign Technology Division, Wright-Patterson Air Force Base, Ohio.

ANCHOVY:
"Areas de migracion y ecologia de la anchoa Lycengraulis olidus (Gunther) en las aguas argentinas (Pisces, fam. Engraulidae)" (Migration areas and ecology of the anchovy Lycengraulis olidus--Gunther--in Argentinian waters--Pisces, fam. Engraulidae), by M. L. Fuster de Plaza and E. E. Boschi, article, Contribuciones Ciencias Seria Zoologica Universidad Buenos Aires, vol. 1, no. 3, 1961, pp. 127-183, printed in Spanish with English summary. Universidad Nacionale de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Buenos Aires, Argentina.

"Dinamika khimicheskogo sostava azovskoi khamsy v svyazi s osobennostyami ee biologii" (Relation of variations in the chemical composition of Azov anchovy Engraulis encrasicholus L. to characteristics of its biology), by G. E. Shul'man, article, Referativnii Zhurnal Biologiia, 1963, 3170, printed in Russian. Akademiia Nauk SSSR, Institut Nauchnoi-Informatsii, Moscow, U. S. S. R.

AQUATIC WEEDS:
"Control of aquatic weeds by the snail Marisa cornuarietis," by D. E. Seaman and W. A. Porterfield, article, Weeds, vol. 12, no. 2, 1964, pp. 87-91, illus., printed. Weed Society of America, University of Wisconsin, Madison, Wis.

ARGENTINA:
Produccion Pesquera Argentina en el Primer Semestre de 1964 (Fishery Production in Argentina in the First Half of 1964), 15 pp., processed in Spanish, August 1964. Departamento de Investigaciones Pesqueras, Direccion General de Pesca y Conservacion de la Fauna, Secretaria de Estado de Agricultura y Ganaderia, Buenos Aires, Argentina.

AUSTRALIA:
Australian Journal of Marine and Freshwater Research, vol. 15, no. 1, July 1964, 109 pp., illus., printed, single copy 10s. (about US$1.40). Editorial and Publications Section, CSIRO, Sixth Floor, 372 Albert St., East Melbourne, C2, Australia. Includes, among others, articles on: "The spiny lobster, Jasus lalandei (H. Milne-Edwards), in South Australia. I--Growth of captive animals," by D. R. Fielder; and "Subterranean freshwater prawns (Crustacea: Decapoda: Atyidae) in Australia," by W. D. Williams.

Eighth Annual Report of the Operation of the Fishing Industry Act 1956 during the Year Ended 30th June

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

1964, 7 pp., processed. Department of Primary Industry, Canberra, A. C. T., Australia.

AUSTRIA:

Österreichs Fischerei, no. 3/4, 1964, 52 pp., illus., printed in German. Bundesinstitut fur Gewasserforschung und Fischereiwirtschaft, Scharfling am Mondsee, Austria. Includes articles on: "Die exakt dosierte anwendung von hydratkall--ein neues heilverfahren bei fischerkrankungen" (Application of a precise dosage of hydrate of lime in a new treatment of fish diseases), by Wilhelm Einsele; "Die jaucheverglftung von fischen--eine ammoniakvergiftung" (Sewage water poisoning of fish--ammonia poisoning), by Elisabeth Danecker; and "Elektrofischerei und gewässerleitvermögen in Österreich" (Electric fishing and stream resources in Austria).

Selling in Austria, by Stuart M. Matlins, OBR 64-70, 12 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) High domestic economic activity, the availability of foreign exchange reserves, strong demand for both consumer goods and capital equipment, and the continuing liberalization of imports--all should assist United States exporters interested in selling in Austria. The report discusses import channels; import requirements; distribution practices; and transportation, port, and storage facilities. Also covers commercial practices in Austria, marketing aids, Government procurement, selling under United States programs, and information for business travelers.

BACTERIA IN FISH:

"Food putrefaction. III--Amine production by putrefactive bacteria in fish," by M. Katae and H. Kawaguchi, article, Bulletin, University of Osaka Prefecture, Ser. B, 1959, pp. 117-127, printed in Japanese. University of Osaka Prefecture, Osaka, Japan.

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"Bacteriology of chilled water during the preservation of fish," by N. N. De Silva, article, Bulletin of the Fisheries Research Station of Ceylon, vol. 16, no. 1, 1963, pp. 1-24, printed. Department of Fisheries, P. O. Box 531, Galle Face, Colombo 3, Ceylon.

A Study of Some Organisms of Public Health Significance from Fish and Fishery Products, by M. D. Appleman, Nora Bain, and J. M. Shewan, Torry Memoir No. 165, 9 pp., printed. (Reprinted from The Journal of Applied Bacteriology, vol. 27, no. 1, April 1964, pp. 69-77.) Torry Research Station, 135 Abbey Rd., Aberdeen, Scotland.

"Survival of staphylococci on frozen fish," by N. N. De Silva, article, Bulletin of the Fisheries Research Station of Ceylon, vol. 16, no. 2, 1963, pp. 11-18, printed. Department of Fisheries, P. O. Box 531, Galle Face, Colombo 3, Ceylon.

BASS:

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Studies for Development of Echo Sounder, Vertical and Horizontal Fish Finder, Utilizing Ultra-Sonic mm. Waves, by Y. Maniwa, Scientific Report No. 4, 137 pp., illus., printed in Japanese with English summary. Fishing Boat Laboratory, Fisheries Agency, Tokyo, Japan, 1962.

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Basic Data on the Economy of the Dominican Republic, by Alfred Ortiz, OBR 64-80, 24 pp., illus., printed, June 1964, 15 cents. Bureau of Foreign Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Discusses the country's geography, population, and Government; economic structure; industrial sectors; financial institutions; foreign trade; Government role in the economy; and economic outlook. Also includes several statistical tables on industrial and agricultural production, foreign trade, and other data.

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EAST CHINA AND YELLOW SEAS:

Conservation of Demersal Fish Resources in the East China and the Yellow Seas, by Shiro Murakami and others, Fisheries Research Series No. 3, 60 pp., illus., printed in Japanese, June 25, 1964. Japan Fisheries Resources Conservation Society, Futaba Bldg., 24, Sakurakawa-cho, Shiba Nishikubo, Minato-ku, Tokyo, Japan.

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"The north-east coast," by H. Jenner, J. R. Lewis, and J. J. S. Cobb, p. 200.

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"The south-east coast, Whitstable area," by G. E. Newell, pp. 178-179.

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"West of Ireland," by M. de Valera and P. O. Ceidigh, pp. 198-199.

ECUADOR:

"Apuntes e informaciones sobre la situation de la produccion pesquera Ecuatoriana y sus mercados" (Memoranda and information on the production situation of the Ecuadorian fishery and its markets), by Domingo Quiroga and Anibal Orbes Armas, article, Boletin Informativo, vol. 1, no. 3, 1964, pp. 1-24, printed in Spanish. Instituto Nacional de Pesca del Ecuador, Casilla 5918, Guayaquil, Ecuador.

Basic Data on the Economy of Ecuador, by Mildred P. Burr, OBR 64-74, 12 pp., illus., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Her participation in the Alliance for Progress and the implementation of a 10-year national economic development plan are important factors in Ecuador's efforts to raise her standard of living. The report discusses her geography, climate, population, and Government; structure of the economy; industrial sectors; labor force; financial organization; foreign trade; and the role of the Government in the economy. A short section on fisheries covers the shrimp fishing grounds near Manta, Ecuador's 1962 exports of more than $2 million worth of fishery products, and her claims of territorial jurisdiction over waters extending 200 miles from the coast.

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"The Australian eel industry," by D. D. Lynch, article, Commercial Fishing, vol. 2, no. 11, July 1964, pp. 22-24, 26, illus., printed. Trade Publications Ltd., 47 Lewis Eady Bldg., 192 Queen St., Auckland, New Zealand. Discusses the use of fyke nets for capturing eels in the swamps and lagoons of the State of Victoria. Also covers the increase in production since the inception of the fishery in 1955 to about 110,000 pounds annually; grading of the eels after capture; removal of slime; evisceration; the smoking process; and packing for market.

"Eel weir fishing," by Don Shiner, article, Pennsylvania Angler, vol. 33, no. 9, September 1964, pp. 2-5, illus., printed, single copy 25 cents. Pennsylvania Fish Commission, South Office Bldg., Harrisburg, Pa. Discusses the construction and operation of the traps for this fast-disappearing method of capturing eels as they migrate down the Delaware River each fall to spawn in the Atlantic Ocean. The traps consist of stone walls 300-400 feet long and 6 to 8 feet high, together with baskets of wooden slats. The migration begins after the first hard frost during the dark of the moon, and continues for about two weeks. Properly prepared, eels are one of the finest eating fish in fresh water.

A Guide to Pond Culture of the Eel, by Isao Matsui, Fisheries Propagation Series No. 4, 116 pp., illus., printed in Japanese, March 21, 1964. Japan Fisheries Resources Conservation Society, Futaba Bldg., 24, Sakurakawa-cho, Shiba Nishikubo, Minato-ku, Tokyo, Japan.

EQUATORIAL CUSTOMS UNION AND CAMEROON:

Foreign Trade Regulations of the Equatorial Customs Union (Central African Republic, Republics of Chad, Congo, Gabon) and Cameroon, by Alfred F. Daiboch, OBR 64-98, 12 pp., printed, September 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) The four component states of former French Equatorial Africa--Central African Republic, and the Republics of Congo-Brazzaville, Chad, and Gabon--which together constitute the Equatorial Customs Union, and the Federal Republic of Cameroon now have a common external tariff. The report discusses their trade policy, import tariff system, sales and other internal taxes, documentation and fees, and labeling and marking requirements. It also covers special customs provisions, nontariff import controls, export controls, United States foreign trade controls, and Government representation between the United States and the five countries.

EUROPEAN FREE TRADE ASSOCIATION:

EFTA (European Free Trade Association)--What It is--What It Does, 8 pp., illus., printed. Washington Information Office, European Free Trade Association, 711 14th St. NW., Washington, D. C. 20005. EFTA united in a free trade area the 97 million people and the markets of 8 European countries which are among the world's most active trading nations. This pamphlet discusses trade without barriers, outward-looking policies, how EFTA came about, the removal of tariffs and quotas, other obstacles to trade, economic development, agriculture and fish, the growth of EFTA trade, EFTA and the world, and how EFTA works.

The Operation of a Free Trade Area, by Torben Jantzen, 24 pp., illus., printed, 1964. Washington Information Office, European Free Trade Association, 711 14th St. NW., Washington, D. C. 20005. The European Free Trade Association is an arrangement between 8 countries (the original 7 members: Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the United Kingdom; and the associated member, Finland) to create a single market by the abolition of tariffs and all other restrictions on the flow of trade between the members, while leaving them free to maintain their own and to follow their own commercial policies concerning third countries. This pamphlet discusses how EFTA started, the EFTA Convention, and its first years. It also covers the operation of EFTA--tariff reductions, the need of an origin system, the 50-percent rule, the process criterion, revenue duties, internal taxes, quantitative import restrictions, rules of competition, double taxation, economic development, EFTA and trade in agriculture, organizational structure, and consultations and complaints. A short section on EFTA and trade in fish states that the main problem facing the fishery nations among the membership is the continuation of access at a satisfactory level to the market of the EEC countries.

FACTORYSHIP:

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The Lipids of Marine Organisms, by J. A. Lovern, Torry Memoir No. 168, 23 pp., printed. (Reprinted from Oceanography and Marine Biology Annual Review, vol. 2, 1964, pp. 169-191.) Torry Research Station, 135 Abbey St., Aberdeen, Scotland.

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On Fish Behaviour in the Zone before a Trawl under the Influence of the Electric Field of an Alternating Current and Mechanical Stimulus, by V. A. Shentyakov, Translation 34, 5 pp., printed, 1964. (Translated from the Russian, Biulletin' Instituta Biologii Vodokhranilishch, no. 8-9, 1960.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

"Further uses of electronically scanned sonar in the investigation of behaviour of fish," by V. G. Welsby and others, article, Nature, vol. 203, no. 4945, August 8, 1964, pp. 588-589, illus., printed, single copy 4s. (about 55 U. S. cents). St. Martin's Press, Inc., 175 Fifth Ave., New York, N. Y. 10010.

Reaction of Fish to the Action of Electric Current, by N. V. Bodrova and B. V. Krayukhin, U. S. Library of Congress Translation No. 4897 (OTS No. 61-13957),

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15 pp., original text included, printed, $3.30. (Translated from the Russian Trudy Soveshchanii, no. 8, 1958, pp. 124-131.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230, 1960.

"The reaction of fish to light in relation to specific characteristics of their light perception," by V. R. Protasov, article, Voprosy Ikhtiologii, vol. 1, no. 3, 1961, pp. 519-532, printed in Russian. Akademia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U. S. S. R.

"Why light attracts fish," by V. N. Beliaeva and I. V. Nikonorov, article, Voprosy Ikhtiologii, vol. 1, no. 3, 1961, pp. 513-518, printed in Russian. Akademia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U. S. S. R.

FISH COOKERY:

All About Fish--a Manual for Teachers, 32 pp., Illus., processed, 1963, C$24.35 per 100 copies. Queen's Printer, Ottawa, Canada. Discusses briefly Canada's fisheries and the Government's role in conservation and development, common varieties of fish for sale in Canada, marketing and distribution, consumer buying, care of fish in the home, fish as a food, and fish on the menu. Also included is information on preparation for cooking, basic methods of cooking fish, and miscellaneous fish recipes.

Fish for Year 'Round Salads, 24 pp., printed, 1962, C$6.50 per 100 copies. Queen's Printer, Ottawa, Canada. Fish is available in many different forms; canned, smoked, fresh, frozen, and pickled. Any of the wide variety of fresh and salt-water fish, as well as shellfish, may be used in salads. This booklet includes, besides instructions for cooking fish for salads, a number of recipes for preparing tossed, combination, mixed, fish and fruit, and molded salads, as well as salad dressings.

Halibut Recipes, 34 pp., processed, 10 cents. Halibut Fishermen's Wives' Association, P. O. Box No. 5129, Seattle, Wash. 98107. Contains recipes for halibut casseroles, chowder, sandwiches, salads, and for cooking halibut by frying, broiling, or baking. Also includes recipes for sauces and stuffing to serve with halibut. Information on thawing, amounts of fish to buy, and minimizing fish odors and flavors in the kitchen is presented.

Let's Serve Freshwater Fish, 32 pp., illus., printed, 1963, C$6.50 per 100 copies. Queen's Printer, Ottawa, Canada. Discusses the variety of Canadian fresh-water fish available, Government inspection of fish, nutritional advantages of fish, and how to know when fish is cooked sufficiently. Includes a number of recipes for preparing all species of freshwater fish, as well as others for cooking goldeye, perch, pickerel, pike, Atlantic salmon, smelt, trout, and whitefish. Other sections give instructions on making sauces and fish salads. Tips are given on keeping fish fresh and freezing fish.

Le Poisson dans la Cuisine Canadienne (The Canadian Fish Cook Book), 96 pp., illus., printed in French, 1959, C$1.25; 97 pp., illus, printed in English, 1962, C$1.25. Queen's Printer, Ottawa, Canada.

A Propos de Poisson--Manuel pour Instituteurs (All About Fish--Manual for Teachers), 32 pp., illus., processed, 1961, C$24.35 per 100 copies. Queen's Printer, Ottawa, Canada.

Salades de Poisson pour Toute l'Annee (Fish for year 'Round Salads), 26 pp., printed in French, 1962, C$4.85 per 100 copies. Queen's Printer, Ottawa, Canada.

Servons du Poissons d'Eau Douce (Let's Serve Freshwater Fish), 35 pp., illus., printed in French, C$6.50 per 100 copies. Queen's Printer, Ottawa, Canada.

FISH CULTURE:

"Marine fish culture in Britain. I--Plaice rearing in closed circulation at Lowestoft, 1957-1960," by J. E. Shelbourne, J. D. Riley, and G. T. Thacker; "II--A plaice rearing experiment at Port Erin, Isle of Man, during 1960, in open sea water circulation," by J. E. Shelbourne; and "III--Plaice rearing in closed circulation at Lowestoft 1961," by J. D. Riley and G. T. Thacker, article, Journal du Conseil, no. 28, 1963, pp. 50-90, printed. Conseil Permanent International pour l'Exploration de la Mer, Charlottenlund Slot, Denmark.

FISH DISEASES:

Proceedings of the Conference on Fish Diseases, 236 pp., illus., printed, 1963. (Translated from the Russian, Akademiya Nauk SSSR Ikhtiologicheskaya Komissiya Trudy Soveshchanii, vol. 9, 1957.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

FISHERIES POLICY:

"Hacia una politica paneuropea de las pescas" (Toward a paneuropean fisheries policy), by Leopold Sublin, article, Industrias Pesqueras, vol. 38, nos. 889-890, May 15, 1964, pp. 185, 187, 189, printed in Spanish. Industrias Pesqueras, Policarpo Sanz, 21-2, Vigo, Spain.

"The London Fisheries Convention and its origins," by R. G. R. Wall, article, Fishing News International, vol. 3, no. 3, July-September 1964, pp. 198-205, illus., printed, single copy 6s. 6d. (about 95 U. S. cents). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England. Outlines the historical and political background of the London Fisheries Convention, adopted early in 1964 by delegations from Austria, Belgium, Denmark, France, the Federal Republic of Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom and Northern Ireland. Also included is the full text of the Convention, which embodies 4 basic principles: (1) that extensions of fishery limits should be made by agreement; (2) that traditional fishing activities by foreign fishermen should be respected; (3) that proper consideration should be given to the needs of local populations which are overwhelmingly dependent upon the fisheries; and (4) that fishery limits and jurisdiction should in no circumstances extend beyond 12 miles.

"The North American fisheries and British policy to 1713," by Charles Burnet Judah, article, University of Illinois Bulletin, vol. 31, no. 1, 1933, 183 pp., printed. University of Illinois, Urbana, Ill.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

FISHERY RESOURCES:

Organization and Management of Research on Marine Fish Resources, by G. R. Williams, FAO Fisheries Technical Paper No. 43, 29 pp., processed, May 1964, distribution restricted. Research Programs Section, Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. Fishery resources may be defined in one of two ways: (1) in a restrictive sense, to denote a fishable stock, or group of stocks, which may or may not yet be exploited; and (2) in a very broad sense, to denote a community or ecosystem, that is a system the elements of which include not only the species being harvested but also those on which they feed or which influence their lives; it also denotes the physical and chemical components that influence the lives of the several species. Most fishery research programs today are concerned mainly with the tasks relating to resources restrictively defined. This paper is based upon the author's experiences in resource research in Australia. It covers the subject under five main headings--policy direction, research plan, operational procedures and controls, reporting results, and structure of the research organization. Included is an operational plan for a survey of shrimp resources of the Gulf of Carpentaria, Australia.

FISH FARMING:

"Fish farming," by Ian Richardson, article, World Fishing, vol. 13, no. 9, September 1964, pp. 41-46, illus., printed, single copy 3s. (about 45 U. S. cents). Grampian Press Ltd., The Tower, 229-243 Shepherds Bush Rd., Hammersmith, London W6, England. A survey of fish farming methods in various countries, including the culture of yellowtail and shrimp in Japan; carp and pike on a 12,355 acre farm in the Ukraine; cod, perch, and catfish in Australia; carp in Syria; and salmon and trout in the United Kingdom and Norway. Each enterprise was able to produce outstanding yields of fish by the use of selective breeding and proper feeding.

FISH FOOD:

Food of Perch (PERCA FLUVIATILIS, L.) and Trout (SALMO TRUTTA, L.) in an Irish Reservoir, by Christopher Moriarty, Proceedings of the Royal Irish Academy, vol. 63, sect. B, no. 1, 31 pp., illus., printed, 1963. Hodges, Figgis & Co., Ltd., Dublin, Ireland.

FISHING LIMITS:

Comments on the 12-Mile Limit, by William F. Royce, Circular No. 215, 3 pp., printed, 1964. Fisheries Research Institute, College of Fisheries, University of Washington, Seattle, Wash.

FISH MEAL:

Available Methionine and Available Lysine in Fish Meal, by S. G. Wiechers and R. M. Bechard, Progress Report No. 72, 3 pp., processed, July 1964. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, Republic of South Africa.

Bulk Handling of B. C. Whole Herring Meal, by F. G. Claggett, Circular No. 32, 7 pp., printed, 1964. Technological Research Laboratory, Fisheries Research Board of Canada, Vancouver, B. C., Canada.

"Pepsin digestibility as an index of quality in fish. Part I--General considerations," by J. A. Lovern, article, Fishing News International, vol. 3, no. 3, July-September 1964, pp. 206, 209-210, 212-213, illus., printed, single copy 6s. 6d. (about 95 U. S. cents). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England. Discusses the methods of measuring protein availability, the growing trend towards international standardization of analytical procedures, principles of the pepsin test, and the reliability of pepsin digestibility as an index of quality. Included are findings of research on pepsin digestibility of proteins conducted at the U. S. Bureau of Commercial Fisheries' Technological Laboratory, College Park, Md.

Recommendations for the Warehousing of Fish Meal, by G. M. Dreosti, R. J. Nachenius, and L. L. van Zyl, Memorandum No. 137, 4 pp., illus., processed, August 1964. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, Republic of South Africa.

Salmonella Contamination of Fish Meal, by G. M. Dreosti, Apply Your Science No. 11, 1 p., printed, 1964. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, Republic of South Africa.

Shipboard Stowage of Fish Meal, by G. M. Dreosti, Memorandum No. 135, 5 pp., printed, 1964. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, Republic of South Africa.

FISH MORTALITIES:

Regarding the Problem of Mutilations of Fishes by Hydraulic Turbines, by Kurt V. Raben, Translation Series No. 448, 11 pp., printed, 1964. (Translated from the German, Die Wasserwirtshaft, no. 4, 1957.) Biological Station, Fisheries Research Board of Canada, Nanaimo, B. C., Canada.

"Studies on fish mortality due to passage through turbines; preliminary report," by Erik Monten, article, Report No. 45, pp. 190-195, printed. Institute of Freshwater Research, Fishery Board of Sweden, Drottingholm, Lund, Sweden.

FISH PONDS:

Study on the Construction Works of Fish Pond from Civil Engineering Viewpoint, by T. Tamura and S. Yamada, Fisheries Propagation Series No. 1, 32 pp., illus., printed in Japanese, December 10, 1963. Japan Fisheries Resources Conservation Society, Futaba Bldg., 24, Sakurakawa-cho, Shiba Nishikubo, Minato-ku, Tokyo, Japan.

FISH POPULATIONS:

"Changes in the fish population in the upper Ohio River following temporary pollution abatement," by Louis A. Krumholz, article, Transactions of the American Fisheries Society, vol. 93, no. 1, 1964, pp. 1-5, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Notes on the Identification of Sub-Populations of Fish by Serological and Biochemical Methods, the Status of Techniques and Problems of Their Future Application, by B. B. Parrish, Fisheries Biology Technical Paper No. 30, 9 pp., processed, 1964. Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme Caracalla, Rome, Italy.

FISH PROTEIN CONCENTRATE:

"Fish flour in human nutrition," by P. Nunes, article, Gazeta Agricola de Angola, vol. 8, no. 4, October 1963, pp. 995-998, printed in Portuguese. Gazeta Agricola de Angola, Luanda, Angola.

A Report to the Fishing Industry on the Characteristics of Fish Protein Concentrates Made from Various Raw Materials, by H. E. Power, Circular (New Series) No. 15, 2 pp., printed. Technological Research Laboratory, Fisheries Research Board of Canada, Halifax, N. S., Canada.

FISH SAUSAGE:

"More about fish sausages," article, World Fishing, vol. 13, no. 9, September 1964, p. 51, illus., printed, single copy 3s. (about 45 U. S. cents). Grampian Press Ltd., The Tower, 229-243 Shepherds Bush Rd., Hammersmith, London W6, England. Japan's annual production of 150,000 tons of fish sausages and 500,000 tons of fish cakes is an indication of the growing demand for prepared foods. Fish sausages are made of minced cod or pollock and tuna and whalemeat, with potato or corn starch, flavorings, and sodium glutimate added. Packed in skins, the final product has a firm texture and a pleasing flavor.

FISH SOUNDS:

"Deep ocean sonic fishes," by N. B. Marshall, article, Oceanus, vol. 11, no. 1, September 1964, pp. 2-7, printed. The Woods Hole Oceanographic Institution, Woods Hole, Mass.

FLORIDA:

Bibliography on Fresh-Water Biology in Florida, by James P. Clugston, 23 pp., printed, 1964. Game and Fresh Water Fish Commission, Leesburg, Fla.

FLOUNDER:

"Feeding habits of the summer flounder in Great South Bay," by John C. Poole, article, New York Fish and Game Journal, vol. 11, no. 1, 1964, pp. 28-34, printed. New York Fish and Game Journal, New York Conservation Department, Albany, N. Y.

FOOD AND AGRICULTURE ORGANIZATION:

"Co-ordinating fishery development for world needs," by Arthur J. Heighway, article, Fishing News International, vol. 3, no. 3, July-September 1964, pp. 193-194, 197, illus., printed, single copy 6s. 6d. (about 95 U. S. cents). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England. Discusses proposals of the Food and Agriculture Organization of the United Nations (FAO) for reorganizing the structure and functions of its Fisheries Division to meet expanded world needs. The basic aim of FAO is to improve nutrition, the well-being of rural populations, and the promotion of economic development. In fisheries, this is of special significance at this time. The gravest problem in nutrition is lack of high-quality protein, for which seas and inland waters have an enormous unrealized potential. The changes that have already taken place are quite dramatic and revolutionary. World fish production has doubled over the past decade. There have been improvements in gear and vessels, growth of marketing organization, and refinements and innovations in processing techniques. Plans for improved services by FAO should evolve following a forthcoming meeting of the Council.

FAO, Functions, Structure, Program--a Briefing Manual for Field Personnel, 32 pp., printed, 1964. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

Informe de la Primera Reunion de la Comision Asesora Regional de Pesca para el Atlantica Sudoccidental (CARPAS), 10-14 de Diciembre de 1962, Rio de Janeiro (Report of the First Meeting of the South West Atlantic Fisheries Advisory Commission (SWAFAC), December 1962, Rio de Janeiro), FAO Fisheries Report No. 12, 56 pp., processed in Spanish, 1963. Comision Asesora Regional de Pesca para el Atlantico Sudoccidental, Rua do Jardim Botanico 1008, Rio de Janeiro, Brazil.

Report of the World Food Congress, Washington, D.C., 4 to 18 June 1963, 167 pp., printed, 1963, $3. Food and Agriculture Organization of the United Nations, Rome, Italy. (For sale by Columbia University Press, International Documents Service, 2960 Boradway, New York, N. Y. 10027.)

The Food and Agriculture Organization has published reports describing that Agency's activities under the Expanded Program for Technical Assistance for developing the fisheries of many countries. These reports have been processed only for limited distribution to governments, libraries, and universities. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

Report on a Fishermen's Training Center in Construction and Operation of Modern Fishing Gear, Held at Tulagi, British Solomon Islands Protectorate, August-October 1961, by P. A. Lusyne, ETAP Report No. 1657, 12 pp., processed, 1963.

Report to the Government of the Federation of Rhodesia and Nyasaland on Fisheries Development Possibilities in Nyasaland, by M. Aref, ETAP Report No. 1761, 44 pp., processed, 1963.

Report to the Government of Tanganyika on Economic Survey of Marine and Inland Fisheries, by J. L. Dibbs, ETAP Report No. 1828, 59 pp., processed, 1964.

Rapport au Gouvernement de la Tunisie la Prospection Systematique des Fonds de Peche au Large des Cotes Tunisiennes (Report to the Government of Tunisia on the Systematic Exploration of the Bottoms for Fish along the Tunisian Coasts), by Vito Fodera, ETAP Report No. 1836, 68 pp., illus., processed, 1964.

FOREIGN AID:

Aids to Business (Overseas Investment), 59 pp., printed, July 1964. Office of Development Finance and Private Enterprise, Agency for International Development, U. S. Department of State, Washington, D. C.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

20523. Describes the programs sponsored by AID to assist businessmen with overseas investments--catalog of investment opportunities, investment surveys, investment guarantees, local currency loans, and dollar loans.

Index to Catalog of Investment Opportunities, 37 pp., printed, revised July 1964. Office of Development Finance and Private Enterprise, Agency for International Development, U. S. Department of State, Washington, D. C. 20523. Abstracts more than 1,400 industrial feasibility and economic studies in friendly developing nations. The first part indexes reports by region and country; the second indexes reports by industry. Included are a group of reports concerning fresh or frozen packaged fish.

FRANCE:

"Compte rendu d'activite des Comites interprofessionnels des Peches maritimes en 1963" (Summary of the activities of the Fishery Committees of the Maritime Fisheries in 1963), article, France Peche, no. 86, July-August 1964, pp. 15-21, 23-24, 26-28, illus., printed in French. France Peche, Boite Postale 179, Lorient, France. Includes reports on the herring, tuna, sardine, mollusk, and seaweed fisheries.

FREEZE-DRYING:

"Astacene pigment loss occurring in freeze-dried shrimp and salmon during storage," by G. Lusk, M. Karel, and S. A. Goldblith, article, Food Technology, vol. 18, no. 5, 1964, pp. 157-158, printed. The Garrard Press, 510 N. Hickory, Champaign, Ill.

"Rapid method for determining the moisture content of freeze-dried shrimp," by J. E. Despaul and D. W. Ezerski, article, Journal of the Association of Official Agricultural Chemists, vol. 46, 1963, p. 1001, printed. Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C. 20004.

FREEZER-TRAWLER:

B-23 and B-18 Types Freezing Trawlers, Polish Maritime News, Press Information, April 5, 1963, 6 pp., processed. Polish Chamber of Foreign Trade, Maritime Branch, Gdynia, ul. Pulaskiego 6, Poland.

FREEZING:

"Technology of fish products. Use of carbon dioxide in the storage of fish," by A. P. Makashev, article, Trudy Vsesoiuznyi Nauchno-issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii, vol. 37, 1959, p. 138, printed in Russian. Institut Morskogo Rybnogo Khoziaistva i Okeanografii, Verkhn. Krasnosel'skaia Ul. No. 17, Moscow, U. S. S. R.

FROZEN FISH:

"Changes in the amount of nitrogenous extractives in frozen fish muscle during storage," by J. Nishimoto, article, Memoirs, Faculty of Fisheries, Kagoshima University, vol. 11, no. 2, 1962, pp. 152-157, illus., printed in Japanese with English summary. Faculty of Fisheries, Kagoshima University, Kagoshima, Japan.

"La experiencia de las importaciones de pescado congelado" (The experience of importing frozen fish), by Mareiro, article, Industrias Pesqueras, vol. 38, no. 892, June 15, 1964, pp. 294-295, printed in Spanish, single copy 50 ptas. (about 85 U. S. cents). Industrias Pesqueras, Policarpo Sanz, 21-2, Vigo, Spain.

"Identificacion de los cambios de calidad en el pescado congelado" (Identification of the changes in quality in frozen fish), by A. Banks, article, Revista del Frio, vol. 8, no. 4, October-December 1963, pp. 169-174, printed in Spanish with English summary. Centro Experimental del Frio, Serrano, 150, Madrid, Spain.

Interconversions of Flavorous Nucleotide Catabolites in Chilled and Frozen Fish, by N. R. Jones. Torry Research Station, Aberdeen, Scotland. Paper presented at XIth International Congress of Refrigeration, August 27-September 4, 1963, Munich, Germany.

"Vacuum-packed frozen fatty fish," by F. Bramsnaes and H. C. Sorensen, article, Bulletin, Institut International du Froid, Suppl. no. 3, pp. 281-288, printed. Institut International du Froid, 177 Boulevard Malesherbes, Paris 17, France.

GEAR:

"Collapsible cray or crab pot," by Alan Temple, article, Fisheries Newsletter, vol. 23, no. 7, July 1964, pp. 17, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia. Describes a Japanese-manufactured crab or cray pot to be tested in Australia. Details of construction and performance are included. Advantages are the savings in storage space, and an increased catch rate achieved by the side entrance as compared to the top-entrance type pot.

"On the influence of hydrodynamic forces upon trawling warp and the choice of wire ropes for high-speed and deep-water trawling," by S. N. Chubarov, article, Rybnoe Khoziaistvo, vol. 38, no. 5, 1962, pp. 45-49, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U. S. S. R.

"Preliminary tests of automatic locks for otter boards," by V. K. Kondourov, article, Rybnoe Khoziaistvo, vol. 38, no. 12, 1962, pp. 41-43, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

Study of Midwater Trawl Fishing Gear and Their Telemeters, by C. Hamuro and K. Ishii, Scientific Report No. 3, 113 pp., illus., printed in Japanese. Fishing Boat Laboratory, Fisheries Agency, Tokyo, Japan, 1961.

GEAR SELECTIVITY:

"A note on the interim effects on catches of changes in gear selectivity," by J. A. Gulland, article, Journal du Conseil, vol. 29, no. 1, June 1964, pp. 61-64, illus., printed, single copy 16 kr. (about US$2.30). Andr. Fred. Host & Son, Bredgade, Copenhagen, Denmark. Discusses a method of predicting the effects, both long-range and short-term, of changes in selectivity (i. e. larger mesh size) on catch, using data on the size composition of the catches before a change in gear, the selectivity of the original and changed gears, and the ratio of fishing to total mortality.

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"Selection by codend meshes and hooks on cod, haddock, flatfish and redfish," by F. D. McCracken, article, Special Publication No. 5, pp. 131-155, printed, 1963. Bedford Institute of Oceanography, P. O. Box 638, Dartmouth, N. S., Canada.

GENERAL:

Farmer's World--The Yearbook of Agriculture, 1964, 607 pp., printed, 1964, $3. The U. S. Department of Agriculture, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.) A book primarily for and about the farmer and his crops but containing a chapter, "Fisheries of the world," by Sidney Shapiro, which points out the increasing importance of fish products to our available supplies of proteins. Discusses the principal marine fish and shellfish, the methods of capture, improved methods of processing, the chief fisheries nations, international trade, and fisheries treaties. Also touches briefly on United States programs for aid to domestic and foreign fisheries, work of the Fisheries Division of the Food and Agriculture Organization of the United Nations, other international organizations concerned with fisheries, and the two Conferences on Law of the Sea held in Geneva in 1958 and 1960. Other articles of interest to people in fisheries and allied fields are "World sources of protein," by Martin G. Weiss and Ruth M. Leverton; "The evolution of competitive markets," by Harry C. Trelogan; "Processing and preservation," by Robert L. Olson and Clyde L. Rasmussen; and "Problems in human nutrition," by Hazel K. Stiebeling and Ruth M. Leverton.

Fishing in the Future, by Dayton L. Alverson and J. Wilimovsky, Reprint No. 542, 5 pp., illus., printed. (Reprinted from Fisheries Newsletter, vol. 23, no. 4.) Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Cronulla, N. S. W., Australia.

Style Manual for Biological Journals (Second Edition), 126 pp., illus., printed, 1964, $3. American Institute of Biological Sciences, 2000 P. St. NW., Washington, D. C. 20036. This style manual is designed for research workers preparing manuscripts for publication in biological journals, and for students and other prospective authors. Style is interpreted broadly to mean forms of expression in scholarly writing, and the general technical requirements of journals, such as details for typing manuscripts, standard abbreviations, and citation of references. Included are two long chapters: one on writing which covers general principles, concise language, word usage, punctuation, and other grammatical details; another on preparation of copy--paper, typing, corrections and insertions, title, abstract, tables, statistics, quotations, footnotes, and other information needed by an author or editor. Also included are shorter chapters on approval of manuscripts and release of results, review of manuscripts, copy editing, proofreading, preservation of materials for the history of science, indexing, and useful references.

GERMAN FEDERAL REPUBLIC:

Archiv fur Fischereiwissenschaft (Archives for Fishery Science), vol. 15, no. 1, April 1964, 62 pp., illus., printed in German. Bundesforschungsanstalt fur Fischerei, Hamburg, Germany. (Available from Westliche Berliner Verlagsgesellschaft Heenemann KG, Berlin-Wilmersdorf, Germany.) Contains, among others, the following articles: "Zusammenhang zwischen Eisdrift, atmospharischer Zirkulation und Fischereii im Bereich der Fangplatze vor der sudostgronlandischen Kuste wahrend der ersten Jahreshalfte" (Relation between ice drift, atmospheric circulation, and the fisheries in the area of the fishing grounds off the southeast Greenland coast during the first half of the year), by A. Meyer; "Ergebnisse von im Jahre 1962 durchgefuhrten Garnelenmarkierungsexperimenten" (Results of the 1963 shrimp marking (color) and tagging experiments), by W. Kourist, E. Mauch and K. Tiews; and "Ein neues elektronisches Schnellverfahren zur Ermittlung der Frische von Seefischen" (A new electrical device which quickly tells the degree of freshness of sea fish), by Chr. Kennings.

Berichte der Deutschen Wissenschaftlichen Kommission fur Meeresforschung, new series, vol 17, no. 3, April 1964, 146 pp., illus., printed in German and English. E. Schweizerbart'sche Verlagsbuchhandlung (Nagele u. Obermiller), Stuttgart, Federal Republic of Germany. Contains these articles: "Biologisch-statistische untersuchungen uber die Deutsche hochseefischerei. Zusammenfassung der Teile I-IV" (Biological-Statistical investigations on the German high-seas fishery. General summary of parts I-IV), by Johannes Lundbeck; and "Uber die verbreitung der fischarten in der Nordsee. I--Juni-Juli 1959 und Juli 1960" (On the distribution of fish species in the North Sea. Part I--June-July 1959 and July 1960), by Dietrich Sahrhage.

GRAYLING:

Synopsis and Biological Data on European Grayling THYMALLUS THYMALLUS (Linnaeus) 1758, edited by Draga Jankovic, FAO Fisheries Synopsis No. 24, processed, 1964. Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

GREAT SLAVE LAKE:

The following reports are available from the Biological Station, Fisheries Research Board of Canada, London, Ont., Canada.

Round Weight Conversion Factors for Great Slave Lake Fish, by J. J. Keleher, 19 pp., Manuscript Report Series (Biological) No. 773, printed, 1964.

Data on Size of Fish from 1956-1962 Winter Great Slave Lake Commercial Fishery, by J. J. Keleher, Manuscript Report Series (Biological) No. 774, 84 pp., printed, 1964.

Data on Size of Fish from 1963 Winter Great Slave Lake Commercial Fishery, by J. J. Keleher, Manuscript Report Series (Biological) No. 778, 28 pp., printed, 1964.

Data on Size of Fish from 1963 Summer Great Slave Lake Commercial Fishery, by J. J. Keleher, Manuscript Report Series (Biological) No. 779, 58 pp., printed, 1964.

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Data on Size of Fish from 1962 Summer Great Slave Lake Commercial Fishery, by J. J. Keleher, Manuscript Report Series (Biological) No. 780, 51 pp., processed, 1964.

GREENLAND:
"Rapport om tokt med F/F Johan Hjort til Vest Grønland i april/mai 1964" (Report of a trip by R/V Johan Hjort to West Greenland in April-May 1964), by Erling Bratberg and Odd Nakken, article, Fiskets Gang, vol. 50, no. 32, August 6, 1964, pp. 486-487, illus., printed in Norwegian. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

GROUNDFISH:
Water Economy and Osmoregulation of Plaice and Flounder, by J. Henschel, Translation No. 38, 32 pp., processed, 1964. (Translated from the German, Wiss. Meeresunters. Kiel, vol. 22, 1936, pp. 91-121.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

GULF OF MEXICO:
The Fertile Fisheries Crescent, by Gordon Gunter, 5 pp., processed. (Reprinted from Journal of the Mississippi Academy of Sciences, vol. 9, 1963, pp. 286-290.) Gulf Coast Research Laboratory, Ocean Springs, Miss. Discusses the strip of coastline lying between Pascagoula, Miss., and Port Arthur, Tex., which produced over 20 percent of the total United States fishery landings in 1961 and 1962. The volume of the Gulf fisheries has been maintained by the menhaden, and during both 1961 and 1962 production was over one billion pounds. Also thriving are the shrimp, rough fish, and oyster fisheries.

The Gulf Coast Research Laboratory (Ocean Springs, Miss.), by Gordon Gunter, 3 pp., illus., printed. (Reprinted from American Zoologist, vol. 3, no. 3, August 1963.) American Society of Zoologists, 104 Liberty St., Utica, N. Y.

HADDOCK:
The Distribution of the Haddock, 1953-1955, by R. Ya. Tseeb, Translation No. 21, 6 pp., processed, 1963. (Translated from the Russian, Akademiia Nauk SSSR, 1958, pp. 228-233.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

HERRING:
"Empleo de equipo electronico en las pesquerias de arenque de Noruega" (Use of electronic equipment in the Norwegian herring fisheries), by Torwald S. Gedharsen, article, Industrias Pesqueras, vol. 38, no. 891, June 1, 1964, pp. 269-270, printed in Spanish, single copy 50 ptas. (about 85 U. S. cents). Industrias Pesqueras, Policarpo Sanz, 21-2º, Vigo, Spain.

Herring Industry Board. Twenty-Ninth Annual Report, for the Year Ended 31st December, 1963, 43 pp., printed, 1964. Her Majesty's Stationery Office, Edinburgh, Scotland.

Herring - North Sea, 1962, Stock Record, edited by Arni Fridriksson, Statistical News Letter No. 18, 58 pp., printed, 1963. Conseil Permanent International pour l'Exploration de la Mer, Charlottenlund Slot, Charlottenlund, Denmark.

"O labil'nosti zhira Atlantichesko-Skandinavskikh sel'dei" (On the lability of fat in Atlantic-Scandinavian herring), by D. A. Shubnikov, article, Voprosy Ikhtiologii, vol. 3, no. 2, 1963, pp. 416-417, printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U. S. S. R.

Plankton and the Feeding of Baltic Herring (Salaka) Larvae in the Gulf of Riga, by L. N. Lisivnenko, Translation No. 33, 44 pp., processed, 1964. (Translated from the Russian, Trudy Nauchno-Issledovatel'skogo Instituta Rybnogo Khozyaistva, Latvia SSSR, vol. 3, 1961, pp. 105-138.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

The following reports are available from the Biological Station, Fisheries Research Board of Canada, Nanaimo, B. C., Canada.

The 1961 Herring Spawn Deposition in British Columbia Coastal Waters, by D. N. Outram, Circular No. 71, 11 pp., printed, 1963.

The Extent of Herring Spawning in British Columbia in 1962, by D. N. Outram, Circular 69, 21 pp., printed, 1963.

The Extent of Herring Spawning in British Columbia in 1963, by D. N. Outram, Circular No. 70, 11 pp., printed, 1963.

HONG KONG:
Foreign Trade Regulations of Hong Kong, by Dawn A. Wachtel, OBR 64-77, 12 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Discusses Hong Kong's trade policy, import tariff, special customs provisions, shipping documents, labeling and marking requirements, nontariff import controls, export controls, United States' foreign trade controls, and diplomatic representation between the United States and that country. Includes tables showing the scale of charges levied on dutiable commodities; and commodities requiring import licenses.

ICHTHYOLOGY:
Age and Growth Studies in Fish--A Systematic Guide for Ichthyologists, by N. I. Chugunova, OTS 61-31036, 132 pp., illus., processed, 1963. (Translated from the Russian, Academy of Sciences of the U. S. S. R., Dept. of Biological Sciences, Board of Ichthyology, Institute of Animal Morphology.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

INDIA:
Administration Report for the Year 1961-62, 176 pp., printed, 1964. Madras Department of Fisheries, Madras City, India.

Report on Fisheries Survey of the River Gandak (North Bihar), by A. David, 10 pp., illus., printed, January 1963. Central Inland Fisheries Research Institute, Barrackpore, India.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

INDONESIA:

Investment Factors in Indonesia, by M. Virginia Webbert, OBR 64-79, 12 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Although direct investment is not permitted at present, a production-sharing arrangement is encouraged by the Indonesian Government. The report discusses Government controls over industry, business organization, taxation regulations, and capital availability and credit. It also covers labor conditions, basic economic facilities, investment services, and Indonesian corporation and personal income tax schedules.

INLAND FISHERIES:

A List of Inland Fishery Workers in Europe, FAO Fisheries Technical Paper No. 15, rev. 1, 80 pp., printed, 1964. European Inland Fisheries Advisory Commission, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

INTERNATIONAL COMMISSIONS:

Annual Report for the Year 1963, 89 pp., printed, 1964. Inter-American Tropical Tuna Commission, La Jolla, Calif.

Comparison and Abstracts of Selected Conventions Establishing Fisheries Commissions, 79 pp., printed, 1962. Legislation Research Branch, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

(International North Pacific Fisheries Commission) Annual Report, 1962, 130 pp., illus., printed, 1964. International North Pacific Fisheries Commission, 6640 NW. Marine Dr., Vancouver 8, B. C., Canada. This is the ninth consecutive annual report of the International North Pacific Fisheries Commission, established by a Convention between Canada, Japan, and the United States on June 12, 1953, for the purpose of promoting and coordinating the necessary scientific studies and to recommend the required conservation measures in order to secure the maximum sustained productivity of fisheries of joint interest. The report contains summary accounts of the annual meeting of the Commission held in Seattle, November 12-17, 1962, and of an interim meeting held in Honolulu, August 13-17, 1962; and a brief resume of administrative activities during the year. It also presents summaries prepared by the national research agencies of investigations which they carry out under the planning and coordination of the Commission. Of principal concern are the salmon, halibut, herring, and king crab fisheries.

Perechen Dokumentov Vosmoi Sessii Sovetsko-Iaponskoi Komissii po Rybolovstvu Sovetskie materiali Komissi, Tom II (List of Documents of the Eighth Session of the Soviet-Japanese Fisheries Commission. Materials Collected by the Soviet Union. Vol. II), 240 pp., processed in Russian, March 2, 1964. Sovetsko-Iaponskaia Komissiia po Rybologstvu v Sever-Zapadnoi Chasti Tikhogo Okeana, Vos'maia Sessiia, Moscow, U. S. S. R. Contains statistical information on 1963 coastal salmon fisheries in the Far East, by areas of fishing.

IRAN:

Selling in Iran, OBR 64-86, 8 pp., printed, July 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Extensive development programs currently are being undertaken throughout the country. A substantial market exists and will continue to exist in the foreseeable future for products and services associated with economic and social development. The report contains information on import channels and requirements; distribution practices; transportation, port, and storage facilities; and wholesale and retail channels. Also discusses commercial practices, trade customs, marketing aids, Government procurement, selling under United States programs, and information for business travelers.

IRELAND:

Report of the Minister for Lands on the Sea and Inland Fisheries for the Year 1962, 85 pp., illus., printed, September 1963, 5s. (about 70 U. S. cents). Government Publications Sales Office, G. P. O. Arcade, Dublin, Ireland. This report covers the activities of the Fisheries Division of the Department of Lands, and includes information and statistics on the quantity and value of Ireland's sea and inland fish and shellfish for 1962, and related data. Also includes sections on the herring fisheries, mackerel investigations, smolt taggings, and salmon rearing experiments.

ISRAEL:

Long-Term Projections of Supply and Demand for Agricultural Products in Israel. 1--General View and Summary, by Yair Mundlak, 237 pp., illus., printed, May 1964. Blumstein's Bookstores, Tel Aviv, Israel. This volume summarizes and analyzes the results of a study of the supply and demand for agricultural products in Israel for the years 1965 and 1975. Includes several small sections concerned with fish. Per capita consumption of fish in Israel in 1960 was 10.4 kilograms; projected consumption in 1965 is 10.9 kilograms, with total consumption expected to be 27,555 tons. In view of the scarcity of water, it is unlikely that there will be a significant increase in production of pond fish. Therefore, unless sea fishing increases faster than in the past, an increase in imports of fish will be required to meet consumption at the 1960 price level. If an arbitrary projection of 20,000 tons total production in 1965 is made, the required import would be about 7,600 tons. The projected consumption of fish in 1975 is 37,900 tons. Assuming that attempts to develop sea fishing will be successful, the projected production is set at 25,000 tons. Then, imports of 12,900 tons will be required.

JAPAN:

Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, no.5, May 1964, 102 pp., illus., printed in Japanese with English abstracts. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba Kaigandori 6, Minato-ku, Tokyo, Japan. Includes, among others, these articles: "On the amount of food required by the Japanese spiny lobster, Panulirus japonicus (V. Siebold), kept in cage in relation to size and temperature," by Masaaki Inoue; "Fundamental studies on the production of alginic acid. IV--On the pigments dissolved in the extracted

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solution of alginic acid," by Yuzo Harada; "Studies on the effects of marine products on cholesterol metabolism in rats. II--The comparison of the effects of eicosapentaenoic and of docosahexaenoic acids," by Takashi Kaneda, Kimie Arai, and Setsuko Tokuda; "Studies on utilization of enzyme from whale pancreas. I--Proteolytic enzyme," by Yuichi Sasano and Michiko Ota; "A biological formation of formaldehyde in the muscle tissue of gadoid fish" (in English), by Keishi Amano and Kinjiro Yamada.

Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, no. 6, June 1964, 81 pp., illus., printed in Japanese with English summaries. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba Kaigandori 6, Minato-ku, Tokyo, Japan. Contains, among others, these articles: "On the distribution of the dolphin, Coryphaena hippurus L., in the Pacific Ocean and the Indian Ocean," by Shunpei Kojima; "On the spawning of the ayu, Plecoglossus altivelis T. & S. IV--Distribution and some geographical features of the spawning ground," by Rikizo Ishida; "Experimental use of fish pumps. IV--Stream patterns compared among various siphonage," by Shn'ichi Yajima and others; "Studies on the external mucous substance of fishes. IX--Preparation of crystalline N-acetylneuraminic acid from the external mucous substance of loach," by Noriyuki Enomoto, Hiroki Nakagawa, and Yukio Tomiyasu; "Studies on the manufacture of chondroitin sulfate from whale nasal cartilage by liquefaction method. I--Preparation of crude chondroitin sulfate by heating liquefaction," by Akimasa Nakashima, Kohei Morinaga, and Haruo Tanaka; "Studies on the antisepsis for agar during the manufacturing process in the mild winter. X--The method of detecting agar decomposing bacteria by the iodine test," by Hiroaki Fujisawa; and "Studies on the nutrition of abalone. II--Protein requirements for growth of abalone, Haliotis discus," by Chinkichi Ogino and Noriko Kato.

Trade and Industry of Japan, vol. 13, no. 2, February 1964, 70 pp., illus., printed. Japan External Trade Organization (JETRO), Publication Division, Daiichi Hotel Annex, 2-7, Uchisaiwai-cho, Chiyoda-ku, Tokyo, Japan. An issue devoted exclusively to Japanese fisheries and fish products. The lead article discusses the geography and social conditions of Japan; the economic importance of the fisheries; the history of the industry since 1930; landings in the distant-water, offshore, and inshore and coastal fisheries; improvements in efficiency and range of vessels; types of processed products manufactured; and the growth of fisheries research and resource conservation. Another covers standards and procedures for export inspection of canned, frozen, salted, and dried fishery products. Other articles describe the culture of oysters, rainbow trout, kuruma-shrimp, colored carp, and goldfish, and pearls; modern freezing and cold-storage facilities; and the production of frozen fishery products, canned fish, fish ham and sausage, dried and salted products, isinglass, fish meal, and marine animal oils.

JELLYFISH:

The Freshwater Jelly-Fish, CRASPEDACUSTA SOWERBYI in Victoria: a New Record, by John K. Ling, General Circular No. 10, 4 pp., printed, 1962. Victoria Fisheries and Wildlife Department, Melbourne, Australia.

KILKA:

The Use of Blocks of Lights in Fishing for Kilka with a Fish Pump, by I. V. Nikonorov, Translation Series No. 4446, 5 pp., printed, 1963. (Translated from the Russian, Rybnoe Khoziaistvo, 1959.) Biological Station, Fisheries Research Board of Canada, Nanaimo, B. C., Canada.

KOREA:

Annual Report for Fishery Products Inspection, 1963, 212 pp., printed, 1964. Central Fisheries Inspection Station, Ministry of Agriculture and Forestry, 103 Wonnam-Dong, Chong-Ro, Seoul, Korea.

LAW OF THE SEA:

Law of the Sea--Convention on the Continental Shelf, Agreement with other Governments--Done at Geneva April 29, 1958. Entered into Force June 10, 1964, TIAS 5578, 56 pp., printed, 1964, 20 cents. Department of State, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

LIBERIA:

Foreign Trade Regulations of Liberia, by Nancy V. Rawls, OBR 64-90, 8 pp., printed, August 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) The Government of Liberia pursues a free trade policy which is designed to promote and encourage international business, to attract private foreign investment by permitting the unhampered movement of currency and goods, and to preserve the principle of most-favored-nation treatment which it accords to all its trading partners. Discusses Liberia's import tariff system, special customs provisions, internal taxes, shipping documents required, and labeling and marking requirements. Also covers import licensing, Liberia's export controls, United States foreign trade controls, and Government representation between the two countries.

LOBSTER:

The Facts about Massachusetts Lobster Statistics, by Thomas Morrissey, Special Scientific Report No. 1, 12 pp., printed, 1964. Massachusetts Division of Marine Fisheries, Boston, Mass.

"Frozen whole lobster now possible for distribution to restaurants," article, Quick Frozen Foods, vol. 27, no. 2, September 1964, p. 87, illus., printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019. The successful development of a fresh frozen whole lobster which will make possible efforts of restaurant operators to keep lobster as a permanent menu item was completed recently by a New York State frozen seafood processor. In the present product, shrinkage is minimized and the meat cleaves from the shell in large sections. The taste and texture of a fresh live lobster is retained without artificial additives.

"Handling and processing Norway lobsters. Part III--Cooking experiments; Part IV--Storage experiments with Norway lobsters," by P. Hovart and W. Vyncke, article, Fishing News International, vol. 3, no. 3, July-September 1964, pp. 221-222, 224-225, 227-228, illus., printed, single copy 6s. 6d. (about 95 U. S.

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cents). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England. Discusses cooking of Norway lobsters by different methods and with variations in salt content of the cooking brine. Experiments were conducted to determine whether cooked or uncooked Norway lobsters had better keeping qualities. It was found that exposure to high temperatures as it occurs frequently in practice has a very unfavorable influence on the quality of these crustaceans. These experiments also indicate that cooking on the fishing vessels could improve quality. It was observed that for storage up to 5 days, polyethylene bags are superior to paper containers in preventing loss in quality and weight.

A Report to the Fishing Industry Regarding the Tolerance of Lobsters for Fluoridated Water and for Various Woods, by James E. Stewart, Circular (New Series) No. 17, 2 pp., printed, 1964. Technological Research Laboratory, Fisheries Research Board of Canada, Halifax, N. S., Canada.

MALAYSIA:

Establishing a Business in Malaysia, by Louise H. Hillson, OBR 64-78, 20 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Encouragingly, all Malaysian areas welcome the fullest participation by private capital in their economic development and make no distinction between investments from local and foreign sources. The report discusses other aspects of the investment climate, legislation governing investment, business organization, and industrial property protection. Also covers employment conditions, taxation regulations, availability of capital, basic economic facilities, and investment information services.

MARINE AIDS:

Light List, Volume II, Atlantic and Gulf Coast--Little River, South Carolina, to Rio Grande, Texas, and the Antilles, 386 pp., illus., printed, 1964, $3. U. S. Coast Guard, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Contains locations of lights, fog signals, buoys, daybeacons, lightships, radiobeacons, and loran stations from Little River, South Carolina, to Rio Grande, Texas, and for the Antilles. Intended to furnish more complete information concerning aids to navigation than can be conveniently shown on charts. Not intended to be used in navigation in place of charts and coast pilots.

Light List, vol. 4--Great Lakes. United States and Canada, 250 pp., printed, 1964. U. S. Coast Guard, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

MARINE FOULING ORGANISMS:

Catalogue of Main Marine Fouling Organisms (vol. I--Barnacles), illus., printed. Organisation for Economic Co-Operation and Development, 2 Rue Andre Pascal, Paris, France.

MARINE RESOURCES:

Report of the First Session of the Advisory Committee on Marine Resources Research, Rome, 28 January-2 February, 1963, Fisheries Report No. 14, 53 pp., processed, 1963. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

MARYLAND:

Nineteenth Annual Report, 1962, 142 pp., printed. Maryland Board of Natural Resources, Annapolis, Md.

MASSACHUSETTS:

A Technical Study of the Scallop & Flounder Industry of New Bedford, Massachusetts, 207 pp., illus., processed, $1. Area Redevelopment Administration, U. S. Department of Commerce, Washington, D. C., 1964. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Deals with the operational problems facing the fishing industry in New Bedford. Special attention was given to the personnel engaged in the industry, both those who work aboard the vessels and those who are engaged in shore facilities. Discussed in detail are the vessels, equipment, sanitation, insurance, and conservation of product. Vessel construction and sources of supply are also an integral part of the report. The problems affecting the product, in regards to geographical location, and the processing of the product, are dealt with in detail. Recommendations regarding all of the above elements have been incorporated into this report for further action for the benefit of the fishing industry in general.

MEDITERRANEAN SEA:

"Bedarf die marine fauna der mediterranen Kustenzone eines schutzes?" (Does the marine fauna of the Mediterranean coasts need protection), by H. R. Haefelfinger, article, Revue Suisse de Zoologie, vol. 70, no. 2, 1963, pp. 252-258, printed in German. Societe Suisse de Zoologie et du Museum d'Histoire Naturelle de Geneve, Geneva, Switzerland.

MEXICO:

Establishing a Business in Mexico, by Katherine E. Rice, OBR 64-82, 28 pp., printed, July 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A generally accepted principle is that foreigners have the right to invest in Mexico and to withdraw the profits and proceeds provided they do so in accordance with Mexican laws. In addition to investment policy, the report discusses entrance and rights of aliens, business organization law, and taxation regulations. It also covers licensing agreements; patents, trademarks, and copyrights; labor legislation; and United States taxation of income earned in Mexico.

Estadisticas Pesqueras Concentradas, 1956-1961 (Fishery Statistics Compilations, 1956-1961), 170 pp., printed in Spanish, 1964. Direccion General de Pesca e Industrias Conexas, Secretaria de Industrias y Comercio, Mexico, D. F.

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MOLLUSCS:
Physiology of Mollusca, edited by Karl M. Wilbur and C. M. Yonge, 1 vol., illus., printed, 1964. Academic Press, Inc., 125 E. 23rd St., New York, N. Y. 10010.

MUSSELS:
Contribucion al Estudio Biologico del MYTILUS PLATENSIS (Contribution to the Biological Study of Mytilus platensis), by Zulma J. Ageitos de Castellanos, 29 pp., illus., printed in Spanish, 1962. Secretaria de Agricultura y Ganaderia de la Nacion Buenos Aires, Argentina.

The Distribution, Ecology, and Life History of the Mussel, ACTINONAIAS ELLIPSIFORMIS (Conrad), in Michigan, by Henry Van der Schalie, Occasional Papers No. 633, 17 pp., illus., printed, 1963. Museum of Zoology, University of Michigan, Ann Arbor, Mich.

"Mussel culture," by B. H. Havinga, article, Sea Frontiers, vol. 10, no. 3, July 1964, pp. 155-161, illus., printed. Institute of Marine Science, University of Miami, 1 Rickenbacker Causeway, Miami, Fla. 33149. Discusses the marine food chain and the part played by the mussel in that chain; the culture of mussels in the Netherlands, France, and Spain--collection and sowing of seeds, care and feeding of the young, and harvesting of mature mussels and preparation for market; and possibilities of expanding the industry.

NATURAL RESOURCES:
The following United States papers prepared for the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas, held at Geneva, February 1963, by the Science Conference Staff, Agency for International Development, U. S. Department of State, Washington, D. C., are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Natural Resources--Energy, Water, and River Basin Development, vol. I, 386 pp., illus., printed, $1.25.

Natural Resources--Minerals and Mining, Mapping and Geodetic Control, vol. II, 362 pp., illus., printed, $1.

Agriculture, vol. III, 272 pp., illus., printed, 75 cents. Includes the following articles on fishery resources and production: "Development of modern fisheries: experiences in the United States," by Lionel Walford; "Improvement of production and preservation methods in an underdeveloped fishery through upgrading fishing vessels, gear, and sanitary procedures," by Charles Butler, H. B. Allen, and Lee Alverson; and "Ocean fishery products and their inland transport in less developed areas," by Wilbert M. Chapman and others.

Industrial Development, vol. IV, 198 pp., printed, 55 cents.

Transportation, vol. V, 164 pp., illus., printed, 50 cents.

Health and Nutrition, vol. VI, 202 pp., illus., printed, 60 cents.

Social Problems of Development and Urbanization, vol. VII, 98 pp., printed, 35 cents.

Organization, Planning and Programming for Economic Development, vol. VIII, 150 pp., illus., printed, 45 cents.

Scientific and Technological Policy, Planning, and Organization, vol. IX, 71 pp., printed, 30 cents.

International Cooperation and Problems of Transfer and Adaptation, vol. X, 71 pp., illus., printed, 30 cents.

Human Resources--Training of Scientific and Technical Personnel, vol. XI, 216 pp., illus., printed, 60 cents.

Communications, vol. XII, 170 pp., illus., printed, 50 cents.

NEW HAMPSHIRE:
Fisheries Division, Annual Report of Operations, 1963, 29 pp., printed, 1963. Fisheries Division, New Hampshire Fish and Game Department, Concord, N. H.

NEW MEXICO:
Natural Resources of New Mexico, 71 pp., illus., printed, 1964. U. S. Department of the Interior, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

NORTHEAST ATLANTIC OCEAN:
"Compte rendu preliminaire de la campagne de la Thalassa en Islande, aux Feroe et a Rockall (Mai-Juin 1963)" (Preliminary report on the cruise of the Thalassa to Iceland, the Faroes, and Rockall Bank--May-June 1963), by Louis Faure, article, France Peche, no. 86, July-August 1964, pp. 39-43, illus., printed in French. France Peche, Boite Postale 179, Lorient, France.

NORTHEASTERN PACIFIC OCEAN:
Soviet Fisheries Investigations in the North-Eastern Part of the Pacific Ocean, edited by P. A. Moiseev, Trudy, vols. 48 and 49, printed in Russian with English summary and table of contents, 1963-1964. Vsesoiuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii, Verkhn. Krasnosel'skaia U1. No. 17, Moscow, U. S. S. R.

NORTHERN RHODESIA:
(Joint Fisheries Research Organization) Annual Report, No. 11, 1961, 118 pp., printed, 1964. Joint Fisheries Research Organization, Lusaka, Northern Rhodesia.

NORWAY:
Fiskeristatistikk 1962 (Fishery Statistics 1962), Norges Offisielle Statistikk XII 144, 84 pp., illus., printed in Norwegian with English table of contents. Fiskeridirektøren, Bergen, Norway. Contains statistical tables on number of fishermen by sole, main, and subsidiary occupation; open and decked-powered fishing vessels by length; quantity and value of all Norwegian sea fisheries, annual average; quantity and value of each species; quantity and value of processed fish products landed; disposition of landings; exports and imports of fish and fishery products; winter herring by disposition; and other related data.

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OCEANOGRAPHY:

Achievements in Oceanography. No. 1--Progress in the Study of the Depths of the Oceans, edited by Lev Aleksandrovich Zenkevich, OTS 60-41204, 253 pp., illus., printed, 1960. (Translated from the Russian, Itogi Nauki, 1959, pp. 5-147.) Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

Boletin del Instituto Oceanografico, vol 1, no. 1, July 1961, 286 pp., illus., printed in Spanish and English, single copy Bs. 6 (about US$1.80). Instituto Oceanografico, Universidad de Oriente, Apartado de Correos 94, Cumana, Venezuela. Includes, among others, an article on: "A racial investigation of the bluefish, Pomatomus saltatrix (Linneaus) of the Atlantic Coast of North America," by William Albert Lund, Jr.

Boletin del Instituto Oceanografico, vol. 1, no. 2, December 1961, 200 pp., illus., printed in Spanish and English, single copy Bs. 6 (about US$1.80). Instituto Oceanografico, Universidad de Oriente, Apartado de Correos 94, Cumana, Venezuela. Includes, among others, these articles: "On some oceanographic observations in the southeastern Caribbean Sea and the adjacent Atlantic Ocean with special reference to the influence of the Orinoco River," by Herman G. Gade; and "Osteologia comparada en ocho especies de Pomadasyidae (Pisces-Perciformes) del Golfo de Cariaco, Venezuela, y áreas adyacentes" (Comparative osteology of 8 species of Pomadasyidae--Pisces-Perciformes--of the Gulf of Cariaco, Venezuela, and adjacent areas), by Francisco Mago Leccia.

Current Bibliography for Aquatic Sciences and Fisheries (Vol. 5, Subject Index--Physical Oceanography), FIb/35, processed, November 1963. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

Current Bibliography for Aquatic Sciences and Fisheries (Vol. 6, Subject Index--Physical Oceanography), FIb/39, processed, March 1964. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

The Design of a Deep Moored Oceanographic Station, by George R. Schick, 14 pp., printed, 1963. Scripps Institution of Oceanography, University of California, La Jolla, Calif. The overall design techniques for a taut nylon mooring are covered. Factors that influence the selection of a surface float configuration are discussed. Deals with some problems of instrument line design and manufacture. A summary of recent experience with this type of mooring is presented.

Developments in Soviet Oceanography, JPRS 21,278, 20 pp., illus., printed, 1963. (Translated from the Russian, Priroda, no. 6, June 1963.) Office of Technical Services, U.S. Department of Commerce, Washington, D. C. 20230.

International Marine Science, vol. II, no. 1, January 1964, 42 pp., processed, Fisheries Biology Branch, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. Includes an excerpt from an address by the late President John F. Kennedy concerning oceanographic research; reports of national committees of Poland and Republic of South Africa; data on the national oceanographic programs of Argentina, Federal Republic of Germany, Chile, Korea, Portugal, United Kingdom, and U. S. S. R.; and information on the Guinean Trawling Survey, and ICNAF Environmental Study. Also outlines forthcoming meetings on marine sciences; meetings of the IOC Working Group on Communications, World Food Congress, International Association of Physical Oceanography, and FAO Working Party for the Rational Utilization of Tuna Resources of the Atlantic Ocean; training courses and seminars, and fellowships; new oceanographic equipment and research craft; and activities of the Intergovernmental Oceanographic Commission, Scientific Committee on Oceanic Research, and the World Meteorological Organization.

International Marine Science, vol. II, no. 2, April 1964, 40 pp., processed. Fisheries Biology Branch, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy Contains information on national committees for oceanographic research in Malaysia, the United States, and Italy; and these international organizations--South West Atlantic Fisheries Advisory Commission, East African Marine Fisheries Research Organization, Inter-Governmental Maritime Consultative Organization, International Association of Physical Oceanography, Pacific Science Association, and Permanent International Association of Navigation Congresses. Outlines the national oceanographic programs of Argentina, Denmark, Federal Republic of Germany, Spain, Sweden, United Kingdom, the United States, and Portugal; projects of the International Biological Programme, International Indian Ocean Expedition, and ICNAF Environmental Study; forthcoming meetings on marine sciences; training courses and seminars, and fellowships; new oceanographic equipment; and activities of the Intergovernmental Oceanographic Commission, and the FAO Advisory Committee on Marine Resources Research.

Lines of Research on Seawater Fertility, by Luigo Provasoli, 32 pp., illus., printed in Japanese with English bibliography, March 28, 1964. Japan Fisheries Resources Conservation Society, Futaba Bldg., 24, Sakurakawa-cho, Shiba Nishikubo, Minato-ku, Tokyo, Japan.

Oceanographic Bibliography, 1960-1963, compiled by H. B. Hachey, 16 pp., printed, 1963. Canadian Committee on Oceanography, St. Andrews, N. B. Canada.

An Oceanographic Investigation of Causes, Mechanisms, and Predictability of Changes in Availability of Tuna in the Eastern Tropical Pacific, Quarterly Report No. 11, 1960; Half-Yearly Report, July-December, 1962, STOR Program Progress Reports, printed. Scripps Institute of Oceanography, La Jolla Calif.

"Okeanograficheskie organizatsii Kanady i osnovnaya tematika ikh rabot" (Oceanographic organizations of Canada and the principal subject of their studies), by A. Ya. Minevich, article, Okeanologiya, vol. 2, no. 5, 1962, pp. 947-948, printed in Russian. Okeanologiya, Akademiia Nauk SSSR, Moscow, U. S. S. R.

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"Preliminary Report on Marine Biological Anomalies on the Pacific Coast of Japan in Early Months of 1963, with Reference to Oceanographic Conditions, by Zinziro Nakai, and others, Contribution A-199, 19 pp., illus., printed. (Reprinted from Bulletin of Tokai Regional Fisheries Research Laboratory, no. 38, February 1964, pp. 57-75.) Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

"Sources of limnological and oceanographic apparatus and supplies," by J. F. T. Saur and others, article, Limnology and Oceanography, suppl. to vol. 9 (Special Publication No. 1, Third Revision), pp. 1-32, printed. Woods Hole Oceanographic Institution, Woods Hole, Mass.

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Undersea Technology, vol. 5, no. 5, May 1964, 51 pp., illus., printed, single copy $1. Compass Publications, Inc., 1111 N. 19th St., Arlington, Va. 22209. Contains among others, articles on: "Congress looks to the sea;" "Oceanography pot boils," by Richard E. Munske; and "Engineering the oceans," by Athelstan Spilhaus.

OCEAN PERCH:
Biology of Reproduction of the Redfishes SEBASTES MARINUS L. and SEBASTES MENTELLA Travin in the Barents and Norwegian Seas, by V. P. Sorokin, Translation Series No. 308, 10 pp., processed, 1960. (Translated from the Russian, Ikhtiologicheskaia Komissiia Akademii Nauk SSSR, Trudy Soveshchanii, no. 8, 1959, pp. 158-170.) Biological Station, Fisheries Research Board of Canada, St. Andrews, N. B., Canada.

Report on the North Atlantic Redfish Fisheries, 9 pp., printed, 1964. White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London EC4, England.

"Scottish redfish larval investigations in 1962 with some observations on mid-oceanic echo-traces," by D. F. S. Raitt, article, Journal Du Conseil, vol. 29, no. 1, June 1964, pp. 65-72, illus., printed, single copy 16 kr. (about US$2.30). Andr. Fred. Host & Son, Bredgade, Copenhagen, Denmark.

OCTOPUS AND SQUID:
"Blekkspruten, den betydning i verdenshusholdningen--Litt norsk import av hermetisk vare fra Japan og Portugal" (Octopus and Squid, their importance in the world economy--small Norwegian import of canned goods from Japan and Portugal), by B. Løvas-Svendsen, article, Tidsskrift for Hermetikindustri, vol. 50, no. 8, August 1964, pp. 269-273, illus., printed in Norwegian. Norske Hermetikfabrikers Landsforening, Stavanger, Norway.

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Odour Abatement Tests at a Fishmeal Plant, by S. W. F. Hanson, Torry Memoir No. 164, 4 pp., illus., printed. (Reprinted from Fishing News International, April-June 1964.) Torry Research Station, 135 Abbey Rd., Aberdeen, Scotland.

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OYSTERS:
"Building an oyster cleansing plant," article, Fisheries Newsletter, vol. 23, no. 7, July 1964, pp. 23-26, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia. Discusses the construction and operation of an inexpensive plant for purifying oysters from sewage pollution. Water is pumped into tanks from the sea and used for 7-14 days. During this period several batches of oysters may be purified in the same water, each batch being held for two nights (36 hours minimum). In managing the unit, consisting of a large subdivided concrete tank, each half of the plant may be filled with oysters on alternate days so that cleansed oysters are available daily. Water is sterilized by exposure to ultra-violet lamps for 24 hours, immediately after being pumped from the sea.

The Effect of Kraft Mill Effluent on the Pacific Oyster (CRASSOSTREA GIGAS) with Particular Reference to Crofton, B. C.," by D. B. Quayle, Manuscript Report Series (Biological) No. 765, 20 pp., illus., printed, 1964. Biological Station, Fisheries Board of Canada, Nanaimo, B. C., Canada.

Recherches sur l'Ostreiculture dans le Bassin de Chasse d'Ostende en 1960 (Research on Oyster Culture in the Tidal Basin at Ostende in 1960), by E. LeLoup and others, 89 pp., illus., printed in French. Ministere de l'Agriculture, Commission T. W. O. Z., Group de Travail Ostreiculture, Ostende, Belgium.

PACIFIC OCEAN:
A Study of Demersal Fishes and Fisheries of the Northeastern Pacific Ocean, by D. L. Alverson, A. T. Pruter, and L. L. Ronholt, H. R. MacMillan Lectures in Fisheries, 194 pp., illus., printed, 1964. Institute of Fisheries, The University of British Columbia, Vancouver, B. C., Canada. Each year, under a fund established by Dr. H. R. MacMillan, a series of

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lectures or a symposium is presented at the Institute of Fisheries, The University of British Columbia, on problems of current interest. When appropriate, the material presented at those sessions has been assembled for publication. This is the fourth such report to be issued. Its purposes are to (1) review the development and magnitude of demersal fisheries in the northeastern Pacific Ocean; (2) describe the gear and fishing techniques used to harvest the resources; (3) summarize results of exploratory fishing surveys to provide information on the distribution, relative abundance, and sizes of demersal fishes inhabiting the continental shelf and continental slope off North America from Oregon to the Bering Sea; and (4) consider the magnitude and current use of demersal fish stocks. Included are chapters on Pacific Coast groundfish fisheries; fishing by Asian nations in the eastern North Pacific; history of United States groundfish explorations--regions surveyed and methods of analysis; flounders; and rockfish. Also discussed in detail are roundfish--cod, hake, sablefish, greenlings, rattails, and sculpins; sharks, skates, and ratfishes; the demersal fish community; distribution and relative abundance as related to environmental factors; and the resource and its use.

PARASITES:

Estimation of Incidence of Larval Nematodes in Cod Fillets from the Southern Canadian Mainland to 1963, by F. D. McCracken and D. N. Fitzgerald, Manuscript Report Series (Biological) No. 781, 10 pp., printed, 1964. Biological Station, Fisheries Research Board of Canada, St. Andrews, N. B., Canada.

PERU:

Market Factors in Peru, by Richard H. Mullins, OBR 64-76, 12 pp., printed, June 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Peru's economy continued its favorable growth in 1963, with real gross national product increasing by 5-1/2 percent. The outlook for 1964 was for somewhat faster growth than in 1963. It is expected that Peru will demand more and more capital goods as opposed to consumer goods in coming years. In addition to future outlook, the report discusses the scope and nature of the Peruvian market; competition and the United States share of the over-all market; and a market analysis for selected commodities and services.

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"Alteration in nerve cells in fish and crustaceans caused by insecticides," by H. Kayser, D. Ludemann, and H. Neumann, article, Water Pollution Abstracts, vol. 37, no. 1, 1964, 173, printed. Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London EC4, England.

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PIKE-PERCH:

Synopsis of Biological Data on Pike-Perch, LUCIOPERCA LUCIOPERCA (Linnaeus) 1758, FB/S28, processed, March 1964, Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

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On the Relation between Stock Density and Growth in the Plaice Population of the German Bight, by Gotthilf Hempel, Translation 23, 8 pp., printed, 1964. (Translated from the German, Berichte der Deutschen Wissenschaftlichen Kommission für Meeresforschung, vol. 14, no. 2, 1958.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

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Toxicity of Pollution to Aquatic Life - a Summary of Research in Canada, by J. B. Sprague, Manuscript Report Series (Biological) No. 771, 18 pp., printed, 1964. Biological Station, Fisheries Research Board of Canada, St. Andrews, N. B., Canada.

PORTUGAL:

Boletim da Pesca, vol. 16, no. 83, June 1964, 83 pp., illus., printed in Portuguese. Gabinete de Estudos das Pescas, R. S. Bento, 644, 4º Esq., Lisbon, Portugal. Includes articles on: "Algumas consideracoes sobre os indices de abundancia da Pescado (Merluccius merluccius L.) na costa of Portugal" (Some considerations on the indexes of abundance of fish--Merluccius merluccius L.--along the coast of Portugal), by Rui Monteiro; "Alguns aspectos da conservacao do peixe pelo sal e sua bacteriologia" (Some aspects of preservation of fish by salt and its bacteriology), by A. T. Botelho; "Selectividade de redes de arrastar" (Selectivity of trawl nets), by Rui Monteiro; and "Portugal e as suas relacoes piscatorias com a Terra Nova e o Canada" (Portugal and its fishery relations with Newfoundland and Canada), by Eurico A. Valadao do Vale.

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The Work of the Torry Research Station and the Humber Laboratory for Research on the Problems of Handling and Preservation of Fish and Fishery By-Products. A Brief Description, 23 pp., illus., printed. Department of Scientific and Industrial Research, Hereford, England.

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"A practical method for brining and smoking fish," by A. W. Lantz, article, Trade News, vol. 16, no. 12, June 1964, pp. 14-17, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Describes, with the help of drawings, the 9 steps involved in brining and smoking fresh-water fish. Included is a plan of the smokehouse, which can be constructed at home. Fish which can be smoked are goldeye, whitefish, tullibee, trout, mullet, pike, and pickerel.

Processing Mussels, Cockles and Whelks, by J. J. Waterman, Torry Advisory Note No. 13, 10 pp., illus., printed, December 1963. Torry Research Station, Aberdeen, Scotland.

A Report to the Fishing Industry on the Problem of Excess Moisture in Fish, by H. E. Power, Circular (New Series) No. 16, 3 pp., printed. Technological Research Laboratory, Fisheries Research Board of Canada, Halifax, N. S., Canada.

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Les Causes de l'Altération du Poisson et l'Influence de la Temperature (Causes of Deterioration of Fish and the Influence of Temperature), by P. Hovart, E. Van Damme, and W. Vyncke, 42 pp., illus., printed in French. (Reprinted from Revue de l'Agriculture, vol. 17, nos. 5-6, May-June 1964, pp. 647-688.) Ministere de l'Agriculture, 10 rue du Meridien, Brussels, Belgium.

"The enzymatic degradation of neurosine as an index of fish quality," by Morris H. Baslow, article, American Zoologist, vol. 3, no. 4, 1963, p. 536, printed. American Society of Zoologists, 104 Liberty St., Utica, N. Y.

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RADIOACTIVITY:

On the Accumulation of Fission Products by Marine Organisms. I--The Accumulation of Strontium-90, Yttrium-91 and Cerium-144 by Benthic Plants and Animals, by G. G. Polikarpov. Translation No. 30, 13 pp., processed, 1964. (Translated from the Russian, Nauchnye Doklady Vysshei Shkoly, Biologivhrdkir Nauki, no. 3, 1960.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

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Nuevas Especies de "Rayas" para la Fauna del Peru (New Species of "Rays" among the Fauna of Peru), by Norma Chirichigno F., Serie de Divulgacion Cientifica 20, 13 pp., illus., printed in Spanish, 1963. Servicio de Pesqueria, Lima, Peru.

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ROCKFISH:

"Sebastodes phillipsi, a new Scorpaenid fish from Californian waters," by John E. Fitch, article, Copeia, no. 3, September 10, 1964, pp. 525-529, illus., printed. American Society of Ichthyologists and Herpetologists, 18111 Nordhoff St., Northridge, Calif. Describes the discovery and identification of a new rockfish from California waters. This fish is found between Monterey Bay and Santa Catalina Island, usually in water deeper than 800 feet. Because of its habit of changing color from a whitish-pink to golden-crimson when boated, it is given the common name of "chameleon rockfish." This species proved to be identical to a fish previously described in 1957 but thought to be a hybrid.

SAFETY:

Safety Afloat, 18 pp., illus., printed. Mobil Oil Company, Marine Retail Department, 150 E. 42nd St., New York, N. Y. 10017. Contains safety rules of value to both the professional and the amateur boatman. Illustrated with colored drawings, it includes information on the pre-cruise safety checklist; buoys, waterway markers; rules of the road; Coast Guard requirements for small craft; emergency drills; safe water skiing; safe fueling procedures; artificial respiration; first aid at a glance; anchoring; coastal weather warnings; and distress signals.

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Abundance, Distribution, and Size of Juvenile Red Salmon of the 1960 Year Class in Iliamna Lake, Alaska, by Ole A. Mathisen, Contribution No. 167, 12 pp., printed, 1964. College of Fisheries, University of Washington, Seattle, Wash.

Annual Report, 1963, 47 pp., printed, 1964. Skeena Salmon Management Committee, Biological Station, Fisheries Research Board of Canada, Nanaimo, B.C., Canada.

Artificial Propagation of Salmon in Japan, by T. Mihara, S. Sano, and H. Eguchi, 62 pp., illus., printed in Japanese. Japan Fisheries Resources Conservation Society, Futaba Bldg., 24, Sakurakawa-cho, Shiba Nishikubo, Minato-ku, Tokyo, Japan.

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Factors Affecting Marine Age at Return in Sockeye Salmon, by Ted S. Y. Koo, Circular No. 208, 9 pp., printed, 1964. Fisheries Research Institute, University of Washington, Seattle, Wash.

"Indian River spawning channel," by J. J. Quigley, article, Trade News, vol. 17, no. 2, August 1964, pp. 3-4, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

The Migration and Exploitation of Pink Salmon Runs in and Adjacent to the Fraser River Convention Area in 1959, by E. H. Vernon, A. S. Hourston, and G. A. Holland, Bulletin XV, 302 pp., illus., printed, 1964. International Pacific Salmon Fisheries Commission, P. O. Box 1120, New Westminster, B. C., Canada.

"Mortality of pink and chum salmon eggs and larvae in southeast Alaska streams," by William John McNeil, article, Disseration Abstracts, vol. 23 (12 Pt. 1), 1963, pp. 4489-4490, printed. University Microfilms, University of Michigan, 313 N. 1st St., Ann Arbor, Mich.

"Nablyudeniya za nerestom gorbushi Oncorhynchus gorbusha (Walbaum) i letnei kety Oncorhynchus keta (Walbaum) v reke My (liman Amura)" (Observations of spawning of pink salmon Oncorhynchus gorbuscha--Walbaum--and chum salmon Oncorhynchus keta--Walbaum--in the My River--Amur Estuary), by I.I. Strekalova, article, Voprosy Ikhtiologii, vol. 3, no. 2, 1963, pp. 256-265, illus., printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U. S. S. R.

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"Rol' vitaminov A i B_1 v vyrashchivanii molodi lososya" (The role of vitamins A and B_1 in the rearing of salmon fry), by Z. I. Chudova, article, Trudy Nauchno-Issledovatel'skii Instituta Rybnoe Khoziaistva Latviisk. SSR, vol. 3, 1961, pp. 421-429, printed in Russian. Four Continent Book Corp., 156 5th Ave., New York, N. Y. 10010.

Salmon Packing: Equipment and Operation, by S. W. Roach and F. G. Claggett, Circular No. 30, 7 pp., printed, 1964. Technological Research Laboratory, Fisheries Research Board of Canada, Vancouver, B. C., Canada.

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The Stock of Baltic Salmon and the Swedish Tagging Experiments, by Borje Carlin, Circular No. 213, 27 pp., printed, 1964. (Translated from the Swedish, Laxforskninginstutet Meddelande.) Fisheries Research Institute, College of Fisheries, University of Washington, Seattle, Wash.

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"O vozraste i dinamike chislennosti tikhookeanskoi gorbushi Oncorhynchus gorbusha (Walb.)" (On the age and population dynamics of the Pacific pink salmon Oncorhynchus gorbuscha (Walb.), by Yu. E. Lapin, article, Voprosy Ikhtiologii, vol. 3, no. 2, 1963, pp. 243-255, illus., printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaia Komissaia, Moscow, U.S.S.R.

The following articles were published in Oregon Fish Commission Research Briefs, vol. 9, no. 1, 1963, printed. Fish Commission of Oregon, 307 State Office Bldg., 1400 SW. 5th Ave., Portland, Oreg. 97201:

"An attempt to mark juvenile silver salmon by feeding selected metallic compounds," by Thomas B. McKee and Wallace F. Hublou, pp. 27-29, illus.

"Length-weight relationship of artificially propagated juvenile silver salmon," by David A. Leith and Ellis J. Wyatt, pp. 37-41, illus.

"An operculum marking experiment on juvenile chinook salmon," by Earl F. Pulford and Lawrence M. Woodall, pp. 30-36, illus.

SALMON AND TROUT:

Cyanide in Salmon and Brown Trout, by A. V. Holden and K. Marsden, Freshwater and Salmon Fisheries Research 33, 15 pp., illus., printed, 1964, 4s. (about 80 U. S. cents). Department of Agriculture and Fisheries for Scotland, Edinburgh, Scotland. (For sale by Sales Section, British Information Services, 845 Third Ave., New York, N. Y. 10022.)

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"Investigation and management of Atlantic salmon and trout. Part 1--The research program; Part 2--The management program," article, Trade News, vol. 17, no. 1, July 1964, pp. 3-15, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Summarizes the 1963-64 research programs conducted by the Fisheries Research Board of Canada's Biological Stations at St. Andrews, N. B., and St. John's, Newfoundland. Investigations were made of the effect of insecticide spraying of New Brunswick forests and associated abundance of salmon; merganser (fish-eating ducks) control; Pollett River, N. B., salmon studies; return of experimentally-displaced salmon parr to their "homes;" return of tagged and marked native smolts in the northwest Miramichi River; Canadian tagged salmon recaptured near Greenland, and mine waste pollution studies. Summarizes the 1963-64 management program in the Maritimes area, Quebec, and Newfoundland. Activities included construction of fish facilities for dams, operation of fish culture stations, salmon transfers, spawning channels, and remedial work on logging dam obstruction.

The Occurrence and Pathology of Dee Disease, by Isabel W. Smith, Freshwater and Salmon Fisheries Research 34, 15 pp., illus., printed, 1964, 15s. (about US$3). Department of Agriculture and Fisheries for Scotland, Edinburgh, Scotland. (For sale by Sales Section, British Information Services, 845 Third Ave., New York, N. Y. 10022.)

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Food-plant Sanitation, by Milton E. Parker and John H. Litchfield, 401 pp., illus., printed, 1962. Reinhold Publishing Corporation, 430 Park Ave., New York 22, N. Y.

Shellfish Sanitation Workshop: Proceedings, November 28-30, 1961, 288 pp., printed, 1962. Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C. 20201.

SARDINE:

Efficiency and Rate of Yolk Utilization by Developing Embryos and Larvae of the Pacific Sardine SARDINOPS CAERULEA (Girard), by Reuben Lasker, 9 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 19, no. 5, 1962, pp. 867-875.) Fisheries Research Board of Canada, Sir Charles Tupper Bldg., Riverside Dr., Ottawa, Canada.

"A sardinha portuguesa de que todo o mundo gosta e uma das maiores fontes de requeza nacional" (The Portuguese sardine, which is enjoyed by the whole world, is one of the major sources of national wealth), article, Jornal do Pescador, vol. 26, no. 306, July 1964, pp. 41-44, printed in Portuguese, single copy 5 escudos (about 18 U.S. cents), Junta Central das Casas dos Pescadores, Rua de S. Bento, 644-4º, Lisbon, Portugal.

World Scientific Meeting on the Biology of Sardines and Related Species, Rome, 1959--Documents to be Considered by Working Group on Sardine Measuring, 1 vol., illus., printed in French, Spanish, and English, 1959. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

SARDINE AND ANCHOVY:

Studies on the Sardine (SARDINA PILCHARDUS Walb.) and Anchovy (ENGRAULIS ENCRASICHOLUS L.) in the Gulf of Naples and Their Behaviour to Artificial Light, by Olav Dragesund, GFCM Studies and Reviews No. 23, 44 pp., illus., processed, June 1964. General Fisheries Council for the Mediterranean, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

SCALLOPS:

"Scallop market," article, Fisheries Newsletter, vol. 23, no. 8, August 1964, pp. 19, 21, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia. Since Australian scallop production in 1963-64 expanded substantially with the utilization of new beds in Victoria, the need to increase exports became apparent. Australian Trade Commissioners overseas were asked to evaluate markets for scallops. This article summarizes the results of those evaluations in France, Belgium, Malaysia, the Pacific Islands, United Kingdom, Greece, Hong Kong, Kenya, Bahrein and Kuwait, the United States, Lebanon, and Venezuela. Included is a table showing estimated Australian scallop exports, 1960/61-1963/64.

SCHOOL-LUNCH PROGRAM:

Food Buying Guide for Type A School Lunches, PA-270 (Revised), 75 pp., illus., printed, $1.25, January 1964. U. S. Department of Agriculture, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402.) Provides information for planning and calculating the quantities of food, including fish and shellfish, to be purchased and used by schools serving Type A lunches in the National School Lunch Program. The Type A lunch pattern is a guide to well-balanced lunches. It is designed to help in planning lunches that supply the kind and amount of foods children need.

SEALS:

"About seals," by Bennet B. Rae, article, Scottish Fisheries Bulletin, no. 21, June 1964, pp. 21-24, printed. Scottish Fisheries Bulletin, Department of Agriculture and Fisheries for Scotland. Edinburgh, Scotland.

"Grey seals and fisheries," by E. B. Worthington, article, Nature, vol. 203, no. 4941, July 11, 1964, pp. 116-118, printed, single copy 4s. (about 55 U.S. cents). St. Martin's Press, Inc., 175 Fifth Ave., New York 10, N. Y.

SEAWEEDS:

Annual Report for 1963, 20 pp., printed. Institute of Seaweed Research, Inveresk, Midlothian, Scotland. Discusses developments in the Scottish and foreign seaweed byproducts industry during 1963, and the Institute's information and technical assistance services. Also discusses production of alginates from seaweed, use of seaweed meal in animal feedstuffs, and development of fertilizers from seaweed. Includes results of investigations on algal polysaccharides, biochemical studies on seaweeds, nitrogenous constituents of marine algae, and chemical composition of marine micro-algae; and a list of publications on seaweeds issued during 1963.

Cultivation of UNDARIA PINNATIFIDA (Harv.) Sur. (Wakame), by Yunosuke Saito, Fisheries Propagation

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Series No. 2, 40 pp., illus., printed in Japanese, February 15, 1964. Japan Fisheries Resources Conservation Society, Futaba Bldg., 24, Sakurakawa-cho, Shiba Nishikubo, Minato-ku, Tokyo, Japan.

Seaweed Symposium, Proceedings, edited by Davy de Virville and J. Feldmann, 491 pp., illus., printed, 1964, $15. MacMillan Company, 60 Fifth Ave., New York, N. Y. 10011. Proceedings of the fourth international seaweed symposium, held at Biarritz, France, in September 1961.

SEROLOGY:

A Serological Approach to the Genus PSEUDOMONAS, by G. Hobbs and others, Torry Memoir No. 166, 12 pp., illus., printed. (Reprinted from The Journal of Applied Bacteriology, vol. 27, no. 1, April 1964, pp. 83-92.) Torry Research Station, 135 Abbey Rd., Aberdeen, Scotland.

SHARKS:

Nuevos Tiburones para la Fauna del Peru (New Sharks among the Fauna of Peru), by Norma Chirichigno F., Serie de Divulgacion Cientifica 19, 20 pp., illus., printed in Spanish, 1963. Servicio de Pesqueria, Lima, Peru.

SHRIMP:

Clave para la Identificacion de los Camarones Marinos y de Rio con Importancia Economica en el Oriente de Venezuela (Key to the Identification of Marine and Fresh-Water Shrimp of Economic Importance in Eastern Venezuela), by Pierre Davant, Cuadernos Oceanograficos, vol. 1, 114 pp., illus., printed in Spanish and English. Instituto Oceanografico, Universidad de Oriente, Apartado de Correos 94, Cumana, Venezuela.

"Claves para identificacion de camarones peneidos de interes comercial en el Ecuador" (Identification key for commercial Ecuadorian Penaeid shrimp), by Harold Loesch and Quinto Avila, article, Boletin Cientifico y Tecnico, vol. 1, no. 2, May 1964, pp. 1-29, illus., printed in Spanish and English, single copy $1. Instituto Nacional de Pesca del Ecuador, Casilla 5918, Guayaquil, Ecuador.

Investigations of the Effect of Vacuum and Carbon Dioxide Packing on the Storage of Frozen Shrimp, by O. Karsti and D. Hakvag, Fiskeridirektoratets Skrifter, Serie Teknologiske Undersokelser, vol. 4, no. 1, 1961, 10 pp., illus., printed in Norwegian with English summary. Serie Teknologiske Undersokelser, Director of Fisheries, Bergen, Norway.

"On the location of a nursery ground of the giant prawn Macrobrachium rosenbergii (de Man)," by K. Raman, article, Current Science, vol. 33, no. 1, 1964, pp. 27-28, illus., printed. Current Science, Current Science Association, Balgalore, India.

Objections to the Proposed Validation under Plenary Powers of a Neotype for CANCER SETIFERUS L. 1767 (Crustacea, Decapoda), by Gordon Gunter, 4 pp., printed. (Reprinted from Bulletin of Zoological Nomenclature, vol. 21, part 3, August 1964, pp. 229-232.) International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Rd., London SW7, England.

A Provisional List of Experts Concerned with the Study of the Biology and Culture of Shrimps and Prawns, by H. Rosa, FAO Fisheries Biology Technical Paper No. 44, 11 pp., processed, 1964. Biology Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

"Shrimp conditions - 1964," by Lyle S. St. Amant, article, Louisiana Conservationist, vol. 14, nos. 9 and 10, September-October 1964, pp. 16-17, illus., printed. Louisiana Wild Life and Fisheries Commission, Wild Life and Fisheries Bldg., 400 Royal St., New Orleans, La. 70130. Summarizes the total shrimp production for the first half of 1964 in the Louisiana fishery, and production and conditions in the brown and white shrimp fisheries. Total shrimp production for 1964 is not expected to equal that of 1963 unless the white shrimp landings exceed those of last year. Total production for the first half of 1964 was about 12.2 million pounds as compared to 15.6 million pounds for the same period in 1963.

SMALL BUSINESS MANAGEMENT:

Long-Range Planning for Small Businesses, by Robert R. Milroy and others, Management Research Summary, 2 pp., processed, 1964. Small Business Administration, Washington, D. C. 20416. Long-term planning involves (1) setting up objectives, and (2) linking them to the present situation by a series of intermediate plans. A good way to reduce long-range plans to concrete form is to project financial statements for each year of the planning period. Those plans should be reexamined in the light of actual results at least once a year.

SMOKED FISH:

"Salting, preservation and processing of sea bass as an intermediate step in the production of smoked fish," by N. I. Sukrutov, article, Rybnoe Khoziaistvo, vol. 1, 1962, pp. 78-81, illus., printed in Russian. V. Krasnosel'skaia 17, B-140, Moscow, U.S.S.R.

Smoked Fish--Recommended Practice for Retailers, Torry Advisory Note No. 14, 5 pp., printed, 1963. Torry Research Station, 135 Abbey Rd., Aberdeen, Scotland.

SMOKING:

Being the Second International Session on Advances in the Engineering of the Smoke Curing Process, Journal of Yugoslav Meat Industry Special Edition, 1962, 100 pp., printed. Yugoslav Institute of Meat Technology, Belgrade, Yugoslavia.

"Influence of seven factors of electrostatic smoking process on final quality of smoked products," by D. J. Tilgner and Z. E. Sikorski, article, Fleischwirtschaft, vol. 15, no. 5, 1963, pp. 391-415, printed in German. Die Fleischwirtschaft, Verlafshaus Sponholz GmbH, Kockstrasse 60-61, Berlin SW68, Germany.

Intensification of the Smoke Curing Process, by D. J. Tilgner. Department of Animal Products Technology, Politechnika Gdanska, Poland. Paper presented at First International Congress of Food Science and Technology, London, September 18-21, 1962.

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SNAIL:

"Immigrant snail is dinner delicacy," by Donald J. Zinn, article, Maritimes, vol. 8, no. 3, Summer 1964, pp. 15-16, illus., printed. Graduate School of Oceanography, University of Rhode Island, Kingston, R.I. Discusses the periwinkle (Littorina litorea), the common snail found abundantly along the New England coast; its history as a human food, introduction from its native European habitat, collection and storage, and methods of cooking.

SOUTH AFRICA REPUBLIC:

Census of the Fishing Industry, 1960-61, South Africa and South West Africa, Special Report No. 258, 34 pp., processed in Afrikaans and English, March 1963, 40 cents (about 56 U.S. cents). The Government Printer, Pretoria, Republic of South Africa. Contains the results of the first census of the South African and South-West African fisheries. Covers the commercial catching, landing, cleaning, salting, icing, sun-drying, and disposal of fish, but excludes factory processing. Includes statistical tables on fishing vessels by harbors; motor boats and trawlers by fishing districts; employment in the fisheries by districts; quantity and value of fish landed by districts; disposal of the catch; revenue; expenditure; assets; and capital expenditure.

Foreign Trade Regulations of the Republic of South Africa, OBR 64-92, 8 pp., printed, August 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D.C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Discusses South Africa's trade policy, import tariff, special customs provision, shipping document, labeling and marking requirements, nontariff import controls, export controls, United States' foreign trade controls, and diplomatic representation between the United States and that country. Also contains a section covering sales and other internal taxes.

SPAIN:

"Comentarios a la pesca española de 1963--la pesca de gran altura, principal factor del aumento pesquero" (Comments on the Spanish catch of 1963--the high seas fishery, principal factor in the growth of the fishing industry), article, Boletim de Informacion, no. 69, June 1964, pp. 11-16, printed in Spanish. Sindicato Nacional de la Pesca, Paseo del Prado, 18-20, 6ª Planta, Madrid, Spain.

Comercio y Consumo de Pesca (Fishery Trade and Consumption), 252 pp., illus., printed in Spanish, 100 ptas. (about US$1.65). Boletim de Informacion del Sindicato Nacional de la Pesca, 18-20 Paseo del Prado, Madrid, Spain.

"Exportacion de pescados, crustáceos y moluscos" (Exportation of fish, crustaceans, and mollusk), article, Informacion Conservera, vol. 12, no. 126, June 1964, pp. 236-238, printed in Spanish, single copy 30 ptas. (about 40 U.S. cents). Informacion Conservera, Colon, 62, Valencia, Spain. A reprint of the Resolution for General Direction of Foreign Commerce of June 10, for the regulation of export of fish, crustaceans, and molluscs.

"Han entregado en 1963, ochenta buques pesqueros" (In 1963, 80 fishing vessels have been delivered), article, Industrias Pesqueras, vol. 38, nos. 889-890, May 15, 1964, pp. 197, 199, illus., printed in Spanish. Industrias Pesqueras, Policarpo Sanz, 21-2, Vigo Spain.

Investigacion Pesquera, vol. 25, January 1964, 161 pp., illus., printed in Spanish with English summaries. Instituto de Investigaciones Pesqueras, Paseo Nacional, s/n, Barcelona-3, Spain. Includes, among others, articles on: "Nombres vulgares y cientificos de las principales especies comerciales de crustáceos de Cadiz" (Common and scientific names of the principal commercial species of crustaceans at Cádiz), and "Biología del atún, Thunnus thynnus (L.), de la costa sudatlantica de España" (Biology of the tuna, Thunnus thynnus L., of the south Atlantic coast of Spain), by Julio Rodriguez-Roda.

Investigacion Pesquera, vol. 26, May 1964, 205 pp., illus., printed in Spanish with English abstracts. Instituto de Investigaciones Pesqueras, Paseo Nacional s/n, Barcelona-3, Spain. Contains, among others, these articles: "Talla, peso y edad de los atunes, Thunnus thynnus (L.), capturados por la almadraba de Barbate (costa sudatlantica de España) en 1963 y comparación con el período 1956 a 1962" (Length, weight, and age of the tuna, Thunnus thynnus, (L.) landed by the tuna fishing fleet of Barbate--South Atlantic coast of Spain--in 1963 and comparison with the period 1956 to 1962), by Julio Rodriguez-Roda; "Dinámica de la pesquería de sardina de castellón, datos de 1961 y 1962" (Dynamics of the sardine fishery of Castellon, between 1961 and 1962), by M. G. Larraneta and P. Suau; and "Variación estacional de la composición química, extracción y caracteristicas del agar-agar de algunas algas (genero Gelidium) de la costa sudatlántica española" (Seasonal variation in the chemical composition, extraction, and characteristics of agar-agar of some algae--genus Gelidium--of the south Atlantic Spanish coast), by R. Establier.

"El nivel de produccion de las pesquerias en España" (The level of production in the Spanish fisheries), by V. Paz-Andrade, article, Industrias Pesqueras, vol. 38, nos. 889-890, May 15, 1964, pp. 193-195, illus., printed in Spanish. Industrias Pesqueras, Policarpo Sanz, 21-2, Vigo, Spain.

SPINY LOBSTER:

"Une interessante experience de peche a la langouste en Afrique du Sud" (An interesting experience in the spiny lobster fishery of South Africa), article, La Peche Maritime, vol. 43, no. 1036, July 1964, pp. 505-507, illus., printed in French, single copy 12 F. (about US$2.45). Les Editions Maritimes, 190, Boulevard Haussmann, Paris, France.

SPITZBERGEN:

The Fishery Characteristics of the West Spitsbergen Area, by T. S. Berger, Translation No. 35, 7 pp., processed, 1964. (Translated from the Russian, Nauchno-Tekhnicheskii Biulletin, PINRO, No. 1, 1961, pp. 45-49.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

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The Biology and Fishery of the Sprat in the Northern Part of the Baltic, by I. I. Kazanova, Trans. N. S. 19,

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19 pp., processed, 1963. (Translated from the Russian, Commercial Fishery Investigations in the Baltic, Trudy VNIRO, vol. 42, 1960, pp. 84-98.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

On the Long-Term Fluctuations in the Abundance of the Baltic Sprat as Related to the Fluctuations in the Productivity of Plankton, by I. I. Nikolaev, Translation Series No. 241, 23 pp., printed, 1959. (Translated from the Russian, Trudy Vsesoiuznovo Nauchno-Issledovatelskovo Instituta Morskovo Rybnovo Khoziaistva i Okeanografii (VNIRO), vol. 34, 1958, pp. 133-153.) Biological Station, Fisheries Research Board of Canada, St. Andrews, N.B., Canada.

The Sprat of the Black Sea, by N.E. Aslanova, Trans. N.S. 10, 7 pp., illus., processed, 1963. (Translated from the Russian, Trudy VNIRO, vol. 8, 1954, pp. 87-98.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England.

SQUID:

"The Newfoundland squid fishery in 1964," by V.M. Hodder, article, Trade News, vol. 17, no. 1, July 1964, pp. 16-18, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

STANDARDS:

"Codex Alimentarius," by Nathan Koenig, article, Foreign Agriculture, vol. 11, no. 38, September 21, 1964, pp. 3-4, illus., printed, single copy 20 cents. Foreign Agricultural Service, U. S. Department of Agriculture, Washington, D.C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.20402.) The development of trading areas throughout the world, improved transportation, and new food technology have all accelerated the pace of international trade in food, bringing about a new urgency for the establishment of standards that would facilitate world trade and also provide essential safeguards for protecting consumer health and insuring fair practices. Under the leadership of two United Nations groups--Food and Agriculture and World Health--an international code of food standards known as the Codex Alimentarius is being formulated. The FAO Fisheries Division assumed leadership for preparatory work in standards for fish and fishery products and last February convened a meeting of experts from 12 countries. The recommendations resulting from the meeting were to be among those considered at an October 1964 meeting of the Codex Alimentarius Commission.

Final Report of the Committee of Experts on International Standards for Fish and Fishery Products, 13 pp., processed, February 20, 1964. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. Contains information on a meeting of the committee held at FAO headquarters, Rome, February 18-20, 1964. The membership consisted of experts from 12 countries actively associated with international trade in fish and fishery products. The Committee carried out the following agenda items: recommendation of priorities among fish and fishery products to be standardized; preparation of a code of principles for fish and fishery products; and preparation of a draft model standard. Also included in the report are a list of participants and observers; a list of canned, frozen, and cured products given priority; a skeleton code of practice; and a suggested model standard.

STERN TRAWLING:

"Stern trawling fashionable," article, Fisheries Newsletter, vol. 23, no. 8, August 1964, pp. 24-26, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia. Discusses, with the aid of diagrams, the operation of a stern trawler; the introduction of this vessel into most fishing countries; the differences between it and the conventional side trawler; and details of construction. Economic advantages of the stern trawler are: it saves up to half the time required by side trawlers to shoot and haul their gear; it saves time by fishing through weather which stops side trawlers; it saves wear, tear, and fuel by cutting out non-productive maneuvering; and it saves labor costs by controlling deck winches from the bridge and by mechanizing the fish-cleaning and gutting process.

Stern Trawling; a Record of the Stern Trawling Conference at Grimsby, England in September, 1963, edited by George Ward, 102 pp., printed, 1964. Fishing News (Books), Ltd., Ludgate House, 110 Fleet St., London EC4, England.

STORAGE:

Bulking, Shelving or Boxing? by J. J. Waterman, Torry Advisory Note No. 15, 13 pp., illus., printed, 1964. Torry Research Station, 135 Abbey Rd., Aberdeen, Scotland.

SUBMARINES FOR RESEARCH:

"Manned submersibles of the world," by John A. Pritzlaff and Richard E. Munske, article, Undersea Technology, vol. 5, no. 8, August 1964, pp. 20-26, illus., printed, single copy $1. Compass Publications Inc., 617 Lynn Bldg., 1111 N. 19th St., Arlington, Va. 22209. Reviews the programs under way and vehicles used for exploring and occupying the ocean's depths. The Bureau of Commercial Fisheries, among other agencies, has expressed a need for a 20-knot scientific submersible, capable of operating at 1,000-foot depths and remaining submerged up to 6 days at a time. Included are photos or drawings of 19 underwater vehicles currently operating or in the planning stages. Also included are specifications of the vehicles.

"Navíos y métodos para los trabajos submarinos" (Vessels and methods for submarine work), by G. Ortolan; "Submarinos de aluminio" (Submarines of aluminum), by Tomas de Galiana Mingot, articles, Puntal, vol. 11, no. 123, June 1964, pp. 3-7, 9, 11, illus., printed in Spanish, single copy 12 pesetas (about 20 U.S. cents). Puntal, Apartado de Correos 316, Alicante, Spain.

SWEDEN:

"Västkustfiskarnas pensionskassa håller årsmöte med 2,600 medlemmar" (Annual meeting of The Pension Fund of West Coast Fishermen with 2,600 members), article, Svenska Vastkustfiskaren, vol. 34, no. 15, August 10, 1964, pp. 300-301, printed in Swedish. Svenska Vastkustfiskarnas Centralforbund, Ekonomiutskottet Postbox 1014, Goteborg 4, Sweden.

SWITZERLAND:

"Unsere fischerei einst, jetzt und in zukunst" (Our fisheries--past, present, and future--Switzerland), by

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Fritz Funk, article, Schweizerische Fischerei-Zeitung, vol. 72, no. 8, August 1964, pp. 246-248, illus., printed in German. Schweizerische Fischerei-Zeitung, Anshelmstrasse 18, Bern, Switzerland. There are about 500 commercial fishermen in Switzerland today. They harvest a water surface area covering 135,000 hectares, consisting of lakes and streams. They produce about 1,500 tons of commercially valuable fish each year. To this can be added the take of about 120,000 male and female sport fishermen, which can be estimated at 600 tons a year.

--Walter Stolting

TAIWAN:

Foreign Trade Regulations of Taiwan, by Dawn A. Wachtel, OBR 64-89, 12 pp., printed, September 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D.C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.) Since Taiwan has few natural resources and cannot yet produce heavy machinery and equipment, imports of most industrial raw materials and capital goods are encouraged. The report discusses Taiwan's import tariff system, special customs provisions, internal taxes, shipping documents required, and labeling and marking requirements. Each also covers import licensing, Taiwan's export controls, United States foreign trade controls, and Government representation between the two countries.

TECHNOLOGY:

Fishery Technology, vol. 1, no. 1, January 1964, 161 pp., illus., printed. Fishery Technology, P.B. No. 39, Chittoor Rd., Ernakulam, India. The first issue of a new periodical to be published every six months by the Society of Fisheries Technologists (India). Contains, among others, these articles: "Impact of technology on Indian fisheries," by N. K. Panikkar; "Study of primary production and its importance in an integrated fisheries research programme," by R. Raghu Prasad; "Faecal indicator organisms in frozen prawn product," by A. Lekshmy and V. K. Pillai; "A rapid procedure for the approximation of bacterial load in fishery products," by Cyriac Mathen and others; "Studies on packaging of fresh fish," by C. V. N. Rao and P. A. Perigrien; "Design of a half ton dehydrator for fish," by M. Swaminath; "Preliminary experiments to evaluate the relative efficiency of different natural baits in line fishing," by R. Balasubramanyan; "The four seam trawl nets operated off Cochin--an analysis of the design aspects--the integration of the various parts of trawl," by R. S. Nair and N. A. George; "A note on proximate composition of tuna fish paste from Minicoy," by A. P. Valsan and others; and "On the use of natural baits for sea fishing in India," by R. Balasubramanyan.

TIDES:

"Precision digital tide gauge," by Frank E. Snodgrass, article, Science, vol. 146, no. 3641, October 9, 1964, pp. 198-200, 205-208, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

TILAPIA:

"Effectiveness of tilapia as live bait for skipjack tuna fishing," by Richard S. Shomura, article, Transactions of the American Fisheries Society, vol. 93, no. 3, 1964, pp. 291-294, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

"Eizahl, eigewicht und gelegeentwicklung in der gattung Tilapia" (Egg number, egg weight and development of the spawn in the genus Tilapia), by Hans M. Peters, article, Internationale Revue der Gesamten Hydrobiologie, vol. 48, no. 4, 1963, pp. 547-576, printed in German with English summary. Internationale Revue der Gesamten Hydrobiologie, Berlin, Germany.

TOXICITY:

"The effect of the environment on the toxicity of poisons to fish," by R. Lloyd and D. W. M. Herbert, article, Journal of the Institution of Public Health Engineers, vol. 61, 1962, pp. 132-145, printed. Institution of Public Health Engineers, 118 Victoria St., Westminster, London SW1, England.

"Ostracitoxin: an ichthyotoxic stress secretion of the boxfish, Ostracion lentiginosus," by Donald A. Thomson, article, Science, vol. 46, no. 3641, October 9, 1964, pp. 244-245, printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

"Seasonal variations of paralytic shellfish toxicity in the California mussel, Mytilus californianus Conrad, and the Pacific oyster, Crassostrea gigas (Thunberg), along the Strait of Juan de Fuca and in Willapa Bay," by Arporna Sribhibhadh, article, Dissertation Abstracts, vol. 24, no. 7, 1964, 3033, printed. University Microfilms, University of Michigan, 313 N. 1st St., Ann Arbor, Mich.

TRAWLING:

Introduction to Trawling, by A. Hodson, 77 pp., illus., printed, 1964. Fishing News (Books), Ltd., Ludgate House, 110 Fleet St., London EC4, England.

TRAWLS:

"Midwater trawls of one-boat types off Egersund," by A. Von Brandt, article, Hansa, vol. 99, no. 13, 1962, pp. 1383-1387, illus., printed in German. C. Schroedter und Co., 10 Stubbenhuk, Hamburg 11, Germany.

TROUT:

"Migration in Maine," by Paul J. Fournier, article, Natural History, vol. 73, no. 8, October 1964, pp. 46-49, illus., printed, single copy 50 cents. The American Museum of Natural History, Central Park W. at 79th St., New York, N. Y. 10024.

TUNA:

"Distribution of fishing effort and resulting tuna catches from eastern tropical Pacific Ocean, by quarters of the year, 1959-1962," by Franklin G. Alverson, article, Bulletin of the Inter-American Tropical Tuna Commission, vol. 8, no. 6, 1963, pp. 317-379, illus., printed. Inter-American Tropical Tuna Commission, La Jolla, Calif.

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"Exploring for tuna," Science News Supplement (11-1), Science News, vol. 11, no. 1, Fall 1964, 4 pp., illus., printed. Allyn and Bacon, Inc., 150 Tremont St., Boston, Mass. 02111.

"An increment technique for estimating growth parameters of tropical tunas, as applied to yellowfin tuna (Thunnus albacares)," by Enrique L. Diza, article, Bulletin of the Inter-American Tropical Tuna Commission, vol. 8, no. 7, 1963, pp. 381-416, illus., printed in Spanish and English. Inter-American Tropical Tuna Commission, La Jolla, Calif.

Katsuo to Maguro (Skipjack and Tunas), 33 pp., illus., printed, 1963. Federation of Japan Tuna Fishermen's Cooperative Associations and the Japan Tuna Fisheries Federation, 7-2, Hirakawa-cho, Chiyoda-ku, Tokyo, Japan. Contains tuna fishery statistics for the year 1962 including number and total tonnage of licensed tuna vessels; tuna catch by vessels based in Japan and in overseas bases, by species and by months; historical data on the mothership-type tuna fishery; export of canned and frozen tuna; utilization of the catch; and yearly average prices paid for different species.

Observations on the Commercial Potential of Tuna in the Oceanic Northwest Atlantic, by James L. Squire, Jr. and F. J. Mather, III, 10 pp., printed. (Reprinted from Gulf and Caribbean Fisheries Institute, 15th Annual Session, November, 1962, pp. 124-133.) Gulf and Caribbean Fisheries Institute, The Marine Laboratory, 1 Rickenbacker Causeway, Miami 49, Fla.

Report of the FAO Working Party for Rational Utilization of Tuna Resources in the Atlantic Ocean; First Session, Rome, 25-30 October, 1963, Fisheries Report No. 13, 23 pp., processed, 1963. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

Review of the (Japanese) Tuna Fishery (Katsuo-Maguro Sōran), compiled by Shoichi Masuda, 844 pp., illus., printed in Japanese, March 1964, 2,100 yen (about US$5.83) plus mailing charges. Suisansha, 8-banchi, Sanei-cho, Shinjuku-ku, Tokyo, Japan. Reviews the historical development of the Japanese tuna fishery and discusses in detail fishing gear and methods; fishing grounds; fishing vessels and equipment; processing methods; products; production, scale, and areas of operation of the home-based, mothership, overseas-based, and Atlantic tuna fleets; and fishing labor force and wage conditions. Also covers vessel loans and insurance; development of the canned tuna, frozen tuna, and tuna sausage industries; marketing and promotion of tuna products; market trends; marketing and sales organizations and their structure; inspection system and regulations; tuna fisheries policy before and after World War II; and international tuna problems.

--Lorry M. Nakatsu

"Some factors affecting the distribution and apparent abundance of yellowfin and skipjack tuna in the eastern Pacific Ocean," by Gordon C. Broadhead and Izadore Barrett, article, Bulletin of the Inter-American Tropical Tuna Commission, vol. 8, no. 8, 1964, pp. 417-473, illus., printed in Spanish and English. Inter-American Tropical Tuna Commission, La Jolla, Calif.

Statistical Research Report on the Tuna Long-Line Fisheries by Fishing Grounds, April-September 1962, 103 pp., illus., printed in Japanese. Research Division, Fisheries Agency, Ministry of Agriculture and Forestry, 2-1 Kasumigaseki, Chiyoda-ku, Tokyo, Japan. Describes the tuna fishing grounds in the Pacific Ocean, Indian Ocean, and Atlantic Ocean. Includes 6 figures (April-September) on distribution of fishing effort by five-degree squares for the three oceans; 24 figures on hooking rates of bluefin, albacore, big-eyed, and yellowfin tuna by months and oceans by five-degree squares; and 66 pages of tables on fishing effort (numbers of sets and numbers of hooks used) and fishing success (catch rate) of the four species of tunas and the swordfishes, by five-degree squares.

--Lorry M. Nakatsu

TUNA AND SARDINES:

"Coup d'oeil sur la pêche au thon et à la sardine en 1964" (A look at the tuna and sardine fisheries in 1964), by L. Plouas; "A Douarnenez--coup d'oeil sur les perspectives des campagnes thonière et sardinière" (Douarnenez--a look at the prospects for the tuna and sardine seasons); "A Concarneau--on ne pense pas que les stocks puissent gener l'écoulement du thon, mais la campagne sardinière est médiocre" (At Concarneau--one does not believe that the stocks will cause restriction of the sale of tuna, but the sardine season is mediocre); "A Lorient--assez bon debut des campagnes sardinière et thonière" (At Lorient--good enough beginning of the sardine and tuna seasons); articles, La Peche Maritime, vol. 43, no. 1036, July 1964, pp. 499-504, printed in French, single copy 12 F (about US$2.45). Les Editions Maritimes, 190, Boulevard Haussmann, Paris, France.

TUNA AND TUNALIKE:

"Northwest Atlantic tunas and bonitos," by S.N. Tibbo and R.A. McKenzie, article, Trade News, vol. 17, no. 2, August 1964, pp. 7-10, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. A new Canadian fishery was started in 1963 when two fishermen from Campobello, N. B., began to fish the offshore stocks of tuna and bonito in the Northwest Atlantic. With two purse-seiners, they caught 366 tons of bluefin and skipjack between August 20 and the end of the season. This article discusses the development of the Atlantic tuna fishery and describes the 5 species of tuna (bluefin, yellowfin, big-eyed, albacore, and blackfin) and the 3 species of bonito (skipjack, common bonito, and false albacore) found in the Northwest Atlantic.

TURKEY:

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THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Balik ve Balikcilik (Fish and Fishery), vol. XIII, illus., printed in Turkish with English table of contents. Et ve Balik Kurumu G. M., Balikcilik Mudurlugu, Besiktas, Istanbul, Turkey. Includes among others, articles on: "Territorial waters law, and "The sponges (Part VI)," July 1964, no. 7, 35 pp.; "Proteins in fish muscle and the influence of canning on the nutritive value of fish," and "Use of fish oils in the control of hypercholesteremia and obesity," August 1964, no. 8, 35 pp.; "Light and bioluminescence on living organisms (Part II)," "Synthetic filaments as utilized in the manufacture of fishing nets and ropes (Part I)," "The valuation of fish products in animal feeding and variations of product manufacturing process (Part I)," and "Observations of Ancona International Fishery Fair and Italy fisheries by technical point of views (Part II)," September 1964, no. 8, 35 pp.

UNDERWATER EXPLOSIVES:

Effects of Underwater Explosives on Aquatic Life, a Bibliography and List of Experts, FAO Fisheries Circular No. 2, 12 pp., processed, 1964. Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

UNDERWATER OBSERVATIONS:

"A combined underwater camera and bottom grab: A new tool for investigation of deep-sea benthos," by Robert James Menzies, Logan Smith, and K. O. Emery, article, Internationale Revue der Gesamten Hydrobiologie, vol. 48, no. 4, 1963, pp. 529-545, printed. Internationale Revue der Gesamten Hudrobiologie, Berlin, Germany.

UNITED KINGDOM:

Scottish Sea Fisheries Statistical Tables, 1963, 50 pp., printed, 1964, 5s. 6d. (about US$1.10). Department of Agriculture and Fisheries for Scotland, Edinburgh, Scotland. (For sale by Sales Section, British Information Services, 845 Third Ave., New York, N. Y. 10022.) Contains 27 statistical tables showing quantity and value of fish landed in Scotland; quantity and value of herring and white fish processed; number of fishing vessels and fishermen; and number of vessels and fishermen and quantity and value of fish landed in creeks.

UNITED STATES GOVERNMENT:

Report of the United States Government to the Food and Agriculture Organization of the United Nations, 1961-63, 100 pp., processed, July 1964. U. S. Department of Agriculture, Washington, D. C. 20250. A report prepared under auspices of the U. S. FAO Interagency Committee in accord with Article XI of the FAO Constitution. Relates the most significant progress and developments during the period under review in the fields of FAO's activities in regard to the three basic objectives of FAO: (1) raising levels of nutrition and living standards; (2) securing improvement in the efficiency of production and distribution of food and agricultural products; and (3) bettering the condition of rural populations. Also outlined are the main problems still outstanding in those fields. The report contains sections on nutrition and home economics, farming in the United States, advances in agricultural research and technology, soil and water conservation, and marketing farm products. It also covers rural living, forestry, information activities, international trade and assistance, and multilateral international activities. A section on fisheries discusses the scope of the United States fishing industry, species and major fishing areas, fishing vessels and gear, processing, imports and exports, per capita consumption of fishery products, and marketing. Information is also included on research developments in technology, exploratory fishing, and biology and oceanography; subsidies, loans, and mortgage insurance programs; the eight international fishery commissions of which the United States is a member; and principal problems--competition from other domestic protein foods, competition from foreign products, safe habitat for fishery resources, downward trend in catches of some major species, and decisions of several countries to increase their territorial fisheries jurisdiction.

U.S.S.R.:

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The Postwar Expansion of Russia's Fishing Industry, by Leon M. Herman, 59 pp., printed, 1964. Committeè on Commerce, United States Senate, Washington, D. C. (Available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

"Rybnoe khozyaistvo estestvennykh vodoemov Voronezhskoi oblasti v 1958-1960 (The fishing industry in natural bodies of water of the voronezh Oblast' in 1958-1960)," by A. V. Fedorov and E. V. Afonyushkina, article, Referativnii Zhurnal Biologiia, 1963, 20183, printed in Russian. Akademiia Nauk SSSR, Institut Nauchnoi-Informatsii, Moscow, U.S.S.R.

VESSELS:

"Statki rybackie dla malych portów polskiego whbrzeza. Czesc II" (Fishing vessels for Poland's small fishing harbours. Part II), by Bohdan Pradzynski, article, Budownictwo Okretowe, vol. 9, no. 8, August 1964, pp. 271-273, illus., printed in Polish. Wydawnictwa Czasopism Technicznych NOT, Warsaw Czachkiego 3/5, Poland.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Structural Research of Small Wooden Fishing Vessels, 29 pp., printed, 1964. Danish Wood Council, Copenhagen, Denmark.

WEATHER CHARTS:

Coastal Warning Facilities Chart, Morgan City, La., to Brownsville, Texas, 1964, 2 pp., processed, 1964. 10 cents. Weather Bureau, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Shows stations displaying small craft, gale, whole gale, and hurricane warnings, explanations of warning displays, and schedules of AM and FM radio, TV, and radiophone stations that broadcast weather forecasts and warnings.

WHALING:

"International Whaling Commission, Sixteenth Annual Meeting," article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol. 53, no. 7, July 1964, pp. 208-209, printed. Hvalfangerforeningen, Sandefjord, Norway.

"The world catch, 1963," article, Norsk Hvalfangst-Tidende (Norwegian Whaling Gazette), vol. 53, no. 7, July 1964, pp. 194-207, illus., printed in Norwegian and English. Hvalfangerforeningen, Sandefjord, Norway. Contains world whaling catch statistics for 1963, together with a discussion of landings by areas and countries, presented to the 16th meeting of the International Whaling Commission in June 1964. Included are tables on whaling in fields outside the Antarctic in 1963 and in Antarctic season 1962/63; whaling results for the various countries; production of byproducts; Antarctic landings, 1951-63; and other related data.

WHITING:

"On the biology of the whiting Gadus merlangus L. in Manx waters," by A. K. Nagabhushanam, article, Journal of the Marine Biological Association of the United Kingdom, vol. 44, no. 1, 1964, pp. 177-202, illus., printed. Cambridge University Press, 200 Euston Rd., London NW1, England.

Regional and Annual Variations in the Growth of Whiting (GADUS MERLANGUS Linne), by Lennart Hannerz, Series Biology, Report No. 14, 64 pp., printed, 1964. Carl Bloms Boktryckeri, Lund, Sweden.

YUGOSLAVIA:

Basic Data on the Economy of Yugoslavia, by Arthur J. Laemmerzahl, OBR 64-83, 16 pp., illus., printed, July 1964, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402.) Discusses the country's geography, population and Government; economic structure; industrial sectors; financial institutions; foreign trade; Government role in the economy; and economic outlook. Also contains a section covering the labor force, wages, and unemployment.

AUSTRALIAN PEARL-CULTURE INDUSTRY DEVELOPING

The Australian pearl-culture industry (started in 1956) is still developing. There are now 11 culture farms scattered across Northern Australia from Exmouth Gulf to Torres Strait, in various stages of production, and they employ 82 Japanese and 153 Australians.

Pearls are being cultured in the large Australian pearl oyster (Pinctada maxima) which can produce a round pearl up to 18 mm. in diameter in from 2 to 3 years--about half the time it takes in Japan where the culturing technique was perfected. The Japanese culture the small Akoya oyster (Pinctada martensii) which produces a pearl up to 11 mm. in diameter in 4 to 7 years.

Japan has 3,000 culture farms which in 1963 produced 79 metric tons of pearls for export, worth £A23 million (US$1.5 million). The United States, Switzerland, West Germany, and Hong Kong are the principal buyers.

Australian cultured pearls are sent to Japan where rounds are graded and half rounds processed, then re-exported to world markets. (Australian Fisheries Newsletter, June 1964.)

Season's
Greetings